Supreme Court of the United States

OCTOBER TERM, 1963

No. 1002

EDWARD J. BRENNER, COMMISSIONER OF PATENTS, PETITIONER

vs.

JACK H. HOFSTETTER

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

INDEX

	Original	Print
Proceedings in the United States Court of Customs and Patent Appeals		
Petition of appeal	1	1
Certificate of Commissioner of Patents to record (omitted in printing)	2	2
Application of Jack H. Hofstetter, Filed February 12, 1962, Serial Number 172,543 for Method and Apparatus for Producing Blow Molded Objects (Including Specifications, Claims, Petition and Oath)	3	2
Drawings (2 sheets)	15	13
Letter of Examiner, dated August 14, 1962	19	15
Letter to Commissioner of Patents requesting amendments to case, dated January 22, 1963	20	16

	Original	Print
Certificate of Commissioner of Patents to record (omitted in printing)—Continued		
Letter of Examiner, dated April 25, 1963	21	17
Appeal to Board of Appeals dated May 24, 1963	22	18
Letter to Commissioner of Patents requesting amendments to case, dated June 26, 1963	22	18
Brief, June 28, 1963	23	19
Examiner's Answer, October 9, 1963	29	25
Reply Brief, October 17, 1963	33	28
Decision of Board of Appeals, April 30, 1964	35	31
Request for Reconsideration, May 20, 1964	38	33
Decision of Board of Appeals, June 11, 1964	42	37
Notice of Appeal to United States Court of Customs and Patent Appeals, July 10, 1964	43	38
Copy of U.S. Patent to John R. Haines, deceased, Mary E. Haines, executrix, #2,632,202	45	41
Copy of U.S. Patent to Orville B. Sherman, #2,780,335	55	49
Copy of U.S. Patent to Kaiji Negoro, #3,019,481	61	53
Rejected Claims 1 to 3 inclusive, and 5 to 18 inclusive	73	63
Minute entry of argument and submission	76	65
Opinion, Smith, J.	77	66
Dissenting opinion, Martin, J.	89	77
Judgment	90	77
Order denying petition for rehearing	91	78
Clerk's certificate re mandate	92	79
Clerk's certificate (omitted in printing)	93	79
Order extending time to file petition for writ of certiorari	94	80
Order allowing certiorari	95	81

[fol. 1]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal No. 7529

In re Application of Jack Hofstetter; Serial No. 172,543; Filed February 12, 1962; METHOD AND APPARATUS FOR PRODUCING BLOW MOLDED OBJECTS

PETITION OF APPEAL—Filed August 19, 1964

August 19, 1964

To the U. S. Court of Customs
and Patent Appeals

Your petitioner, Jack H. Hofstetter of Anaheim, in the County of Orange and State of California, respectfully represents:

That he is the original and first inventor of certain new and useful improvements in Method and Apparatus for Producing Blow Molded Objects.

That on the 12th day of February, 1962, in the manner prescribed by law, he presented his application to the Patent Office, praying that a patent be issued to him for the said invention.

That such proceedings were had in said office upon said application; that on the 11th day of June, 1964, after request for reconsideration, it was rejected by the Board of Appeals and a patent for said invention was refused him.

That on the 10th day of July, 1964, your petitioner, pursuant to Section 142 of Title 35, United States Code, gave notice to the Commissioner of Patents of his appeal to this honorable court from his refusal to issue a patent [fol. 2] to him for said invention upon said application as aforesaid, and filed with him, in writing, the special reasons of appeal hereinafter included.

That the Commissioner of Patents has furnished him a certified transcript of the record and proceedings relating to said application for patent, including the notice and reasons of appeal, which transcript is filed herewith and is to be deemed and taken as a part hereof.

Wherefore your petitioner prays that his said appeal may be heard upon and for the reasons assigned therefore to the Commissioner as aforesaid, and that said appeal may be determined and the decision of the Commissioner be revised and reversed, that justice may be done in the premises.

Respectfully,

CUSHMAN, DARBY & CUSHMAN

By PAUL N. KOKULIS
His Attorney

LAWRENCE A. HYMO
H. CALVIN WHITE
WHITE and HAEFLIGER of Los Angeles, California
Solicitor and of Counsel

[File Endorsement Omitted]

[fol. 2]

[Commissioner of Patents Certificate to record omitted in printing]

APPLICATION OF JACK H. HOFSTETTER, FILED FEBRUARY 12, 1962, SERIAL NUMBER 172,543, FOR METHOD AND APPARATUS FOR PRODUCING BLOW MOLDED OBJECTS

To all Whom it May Concern:

BE IT KNOWN THAT I, JACK H. HOFSTETTER, a citizen of the United States of America, residing in Anaheim, in the County of Orange, State of California, have invented

a new and useful improvement in METHOD AND APPARATUS FOR PRODUCING BLOW MOLDED OBJECTS of which the following is a specification:

This invention has to do generally with the blow molding of plastic containers by initial formation of a tubular expansible parison which is received within a multisection mold and expanded by internal air pressure to the mold configuration. The invention is particularly concerned with such blow molding of containers having relatively wide variances between neck and bottom diameters, such for example as jugs or bottles in the half-gallon to full gallon size range.

It has been recognized that to blow mold a tubular parison having uniform wall thickness for the formation of such containers, would result in such variances in wall thicknesses as to unacceptably weaken (because of thin- [fol. 4] ness due to large diameter expansion) the enlarged lower or bottom extent of the container, assuming the parison wall thickness to be reasonably economical for the formation of the smaller diameter or neck portion of the contained. Of the parison wall thickness is increased to allow for adequate wall thickness and strength of the large diameter portion of the container, then the container becomes uneconomical because of excessive plastic consumption in forming the neck portion with wall thickness greater than is necessary.

In recognition of this problem, it has been proposed in the past to extrude successive lengths of the parison with different wall thicknesses, the greater thickness extent being expanded to form the large diameter portion of the container, with the lesser wall thickness of the parison expanded to form the lesser diameter or neck extent of the container. This expedient accomplishes to a degree, plastic distribution in the blown container in keeping with the practical requirements of different diameter wall thicknesses, but it does not afford desirable uniformity, or strength, in certain areas in the large diameter bottom extent of the container wall, because of the parison expansions in relation to the manner in which the parison is confined by the mold. This condition arises because the container bottom forming end of the parison is pinched

together between and along the parting line of the mold sections, so that blowing conformance of the parison to the mold involves relatively great displacement and stretching normal to the parting line, but much lesser displacement and stretching in the direction of the parting line. As a consequence, the parison wall thickness is reduced much more greatly in blowing to a diameter normal to the parting line, and in order to afford adequate wall thickness at that diameter, unnecessary wall thickness would exist at the parting line diameter.

The present invention has for its primary object to effect distribution of the parison plastic in a manner that will overcome the last discussed difficulty by providing [fol. 5] adequate material for container strength at the blown diameter normal to the parting line, while limiting plastic usage to only that required for the wall thickness in the axial plane of the parting line, all to the end of meeting the strengths requirements of the enlarged portion of the container while avoiding excessive plastic consumption. The invention employs the prior proposal of extruding successive lengths of the parison at different wall thicknesses, but contemplates certain new concepts with respect to circular distribution of the plastic material in that portion of the parison that forms the bottom or enlarged diameter extent of the container.

In accordance with the invention, the parison is extruded at differential wall thicknesses not only longitudinally of the parison, but also radially in the thicker wall length which forms the bottom portion of the container, and specifically at thickness which increases preferably uniformly from opposite sides of the axial parting line plane. This thickness pattern is achieved by providing at the corresponding mandrel position, essentially crescent-shaped thickness increase starting at or near the parting line plane, thus affording material increase in keeping with the progressively increasing expansion given the parison as it is blown to the maximum diameter normal to the parting line. In this manner it is possible to achieve or approach as closely as may be necessary for practical purposes, plastic distribution to substantially uniform wall thickness.

The invention employs parison extruding apparatus comprising a tubular wall structure including a die section, and a mandrel annularly spaced from the wall structure and die to form the extrusion passage. Axial shifting of the mandrel may be accomplished in any suitable manner for variation and control of the parison wall thicknesses, as and for the purposes explained. It is found particularly feasible to form two die and opposed mandrel surfaces with generally parallel frustroconical surfaces and to achieve increase in the parison wall thickness at [fol. 6] opposite sides of the parting line plane, by recessing the die, all as will later appear.

Also, preferably, I provide for introduction of blowing air to the parison through the mandrel, and while the invention broadly contemplates any workable relation between the extrusion appartus and the mold, the invention will be described with reference to an association whereby the extrusion head is positioned to deliver the parison directly into an open mold assembly.

All the various features and objects of the invention will be further understood from the following detailed description of the illustrative embodiments shown by the accompanying drawings, in which:

Fig. 1 is a sectional showing, diagramatic in respects, of an illustrative parison extruding mechanism constructed and operated in accordance with the invention, together with an illustrative mold assembly for reception and blowing of the parison;

Fig. 2 is an enlarged cross section on line 2-2 of Fig. 1;

Fig. 3 is a fragmentary enlargement of the lower end of the mandrel and surrounding die, taken in the plane of Fig. 1;

Fig. 4 is a cross section on line 4-4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 showing the mandrel in raised position;

Fig. 6 is a section on line 6-6 of Fig. 5;

Fig. 7 is a bottom view taken on line 7-7 of Fig. 4;

Fig. 8 is a section taken on line 8-8 of Fig. 5;

Figs. 9 and 10 are views similar respectively to Figs. 4 and 3, showing a variational embodiment of the invention; and

Fig. 11 is a bottom view taken on line 11-11 of Fig. 10.

The assembly appearing in Fig. 1 comprises a parison extruding means generally indicated at 10, and typically a two section mold, generally indicated at 11, into which the parison is extruded for blowing, as will later appear. [fol. 7] In further reference to the mold 11, the latter is shown to comprise a pair of sections 12 movable laterally apart and together by suitable means, not shown, to receive a tubular heated and inflatable parison 13 in the open condition of the mold sections so that the parison extrudes down, centrally of the mold cavities 14, a distance such that when the mold sections come together, the lower end of the parison is pinched together at what is termed in the art the parting line or axial plane 15 of the mold. As will be understood, the mold sections come together and interengage in the axial plane of the bottom parting line 15 and the side parting lines 15*a*. The parison is shown to be blown typically to form a container 16 having a relatively large diameter bottom and body portion 16*a*, and a reduced neck portion 16*b*. At this point it may be mentioned that since the invention is concerned with variable thickness extrusion and blowing of the parison as in accordance with the Fig. 1 showing, and not with subsequent disposition of the blown container, the showing and description are not encumbered by such additional expedients as would be used in practice, such as employment of known means for severing the parison at the mold head, or for shifting the mold assembly to allow for continuous extrusion of the parison if desired.

The parison extrusion means 10 comprises a tubular body structure including a section 18 receiving at its upper end a bushing 19 and at its lower end a die portion 20. This body structure contains an axially reciprocable mandrel 21 annularly spaced at 22 from the surrounding body structure, the lower end of the mandrel being frusto-conically tapered at 23 and spaced from the surrounding surface of the die at 24, so that spaces 22 and 24 form a parison extrusion passage into which heated plastic is introduced under the required pressure through inlet 25.

Any suitable means may be employed for controllably shifting the mandrel 21 to vary the spacing at 24 in accordance with the thickness requirements of different

length portions of the parison. Merely as illustrative, the [fol. 8] mandrel head 26 is shown to be engaged by cam 27 which, together with the upward thrust of coil spring 28, axially reciprocates the mandrel as and for the purposes stated. Blowing of the parison occurs by introduction of air from line 29 through axial passage 30 in the mandrel.

The structure 10 described, thus far is known in the art to be usable for parison extrusion at varying wall thicknesses in that elevation of the mandrel, corresponding say to the Fig. 5—Fig. 6 position, increases the cross sectional area of the space at 24, thus causing the parison to be extruded at greater wall thickness, whereas lowering of the mandrel to the Fig. 3—Fig. 4 position reduces the spacing at 24 and therefore the parison wall thickness. Thus it is known that the lower extent of the parison going into the mold may be extruded at greater thickness to compensate for greater blowing expansion to the large diameter of the mold cavity, and that the upper extent of the parison may be extruded at reduced wall thickness in keeping with the lesser expansion required to form the upper and neck extents of the container.

The problem, however, of achieving plastic distribution to form the large diameter portion of the container with necessary strength consistent with economy in plastic consumption, is not solved merely by extruding the lower extent of the parison at uniform, though increased, wall thickness. The reason will be understood from Fig. 2 wherein the lower end of the parison is shown to be pinched together along the mold parting line 15, from which the flattened parison is to be blown generally in the direction of the parting line a relatively short distance x to the opposite mold surface, whereas on the radium y normal to the parting line, the distance to the corresponding mold surface is far greater. The result is that the parison wall thickness is thinned variably and generally proportionately to the distance of expansion, so that while an expanded thickness in x direction might be both adequate and economical, the reduced thickness in the y di- [fol. 9] rection would so weaken the corresponding wall area of the container as to render the latter unsafe, or

require the use of additional plastic which would appear as excess in the *x* direction.

This problem is met in accordance with the invention by extruding the parison not only at variable wall thickness longitudinally of the extrusion, but also circularly thereof, at least with respect to that portion of the parison which forms the enlarged diameter portion of the container.

Circular variation in the parison wall thickness is accomplished in accordance with the showings in Figs. 3 to 8, wherein Figs. 3 and 5 are sections in the mold parting line plane, and Figs. 4 and 6 are axial sections normal to that plane. As viewed in Figs 4 and 6, the internal die surface is recessed at 32 (beyond the straight taper of Figs. 3 and 5), by gradually angling the surface downwardly and outwardly at 33 to a location 34 of maximum departure, beyond which the die surface is coverged at 35 to a bottom opening at 36 which may be substantially circular at a diamster corresponding to the diameter of the opening as viewed in Fig. 5. As best viewed in Fig 8, the maximum degree of recess at 34 gradually and progressively reduces at 37 from a maximum indicated by the dimension *d*, to the parting line plane dimension at *c*, so that the extrusion passage increase is an essentially crescent-shaped enlargement beyond the die diameter at *c-c*.

In extruding the parison to form a container as shown in Fig. 1, the cam 27 is so controlled as to permit the mandrel initially to raise to the Fig. 5—Fig. 6 position, where the mandrel remains throughout extrusion of that length of the parison required to blow the large diameter extent of the container. In this position of the mandrel, the parison wall shape and thickness are governed by the shape of the extrusion passage 24 at the mandrel tip opposite the maximum recess at 34. Accordingly, the parison is extruded in conformance with the passage shape about the mandrel as viewed in Fig. 8. The increased thickness at *d* being predetermined in accordance with the [fol. 10] material requirements for expansion to the dimension *y* in Fig. 2, it will be seen that the increased plastic material is made available for blowing ultimately to substantially uniform wall thickness, in conformance with the mold cavity.

Following extrusion of the thickened wall length of the parison, the mandrel is forced down to the Fig. 3—Fig. 4 position at which the extrusion passage outlet reaches or approaches circularly uniform radial width. Thus the parison continues to be extruded with a cross sectional shape corresponding to the spacing about the mandrel in Fig. 7, wherein the spacings at *a* and *b* are close to uniformity, although *a* may be slightly less, and the space width and resulting thickness of the parison will be somewhat less than the spacing and thickness corresponding to *c* in Fig. 8, since less wall thickness is required for the neck portion of the container.

Figs. 9 to 11 illustrate a variational form of the invention, similar in all respects to that described, except that here the mandrel and die surfaces 40 and 41 have generally frustro-conical downward and outward angularities. Recessing of the die to serve the purposes of the previously described recessing at 34 is accomplished by outward angular departure of the bottom surface of the die at 42, the maximum departure being in the plane of Fig. 10, with gradual restoration along the surfaces at 43 to spacing at *c* (corresponding to *c* in Fig. 8) in the parting line plane. The result again is a crescent-shaped wall thickness increase given the parison as it extrudes out of the die. To extrude the upper neck-forming length of the parison at reduced and substantially uniform wall thickness, the mandrel is raised to the broken line position where the extrusion passage is reduced to substantially circular uniformity at 44, corresponding to the substantially equal dimensions *a* and *b* of Figs. 3 and 4.

Upon reception of the full parison between the (open) mold sections 12, the latter close as shown in Fig. 1, and compressed air is discharged through the mandrel passage 30 to blow the container.

[fol. 11] I CLAIM:

1. In the formation of reduced diameter upper portion and enlarged bottom diameter containers by extruding a tubular parison and expanding the parison by internal air pressure within a mold comprising a pair of cavitated sections adapted to pinch together the walls of the parison

along a bottom diameter in an axial plane of the formed container, the method that includes:

(1) extruding one extent of the parison having at opposite sides of said plane a relatively lesser wall thickness throughout a length of the parison which forms said reduced diameter portion of the container, and

(2) extruding another container bottom-forming extent of the parison of wall thickness at opposite sides of said plane which is greater than the first mentioned wall thickness and greater than the wall thickness of the last mentioned extent in said plane.

* * * *

For Claims 2 and 3, see Rejected Claims 2 and 3.

4. The method of claim 1, including the further step of internally blowing the extruded extents of the parison to form the container.

* * * *

For Claims 5 to 7 inclusive, see Rejected Claims 5 to 7 inclusive.

8. Apparatus for forming hollow plastic containers by extruding and blow molding a tubular parison, comprising an outer tubular structure and a mandrel movable axially within and annularly spaced from the wall of said structure to form an annular extrusion passage, means for forcing plastic material through said passage to form a tubular parison, said structure including a die extent surrounding a portion of the mandrel and having at one relative axial mandrel position lesser annular spacing about and at opposite sides of an axial plane of the man- [fol. 12] drel, and having in another relative axial mandrel position greater spacing about the mandrel which increases at opposite sides of said plane, and means for shifting the mandrel between said positions during extrusion of the parison to form the latter with different wall thicknesses corresponding to said spacings.

* * * *

For Claims 9 to 12 inclusive, see Rejected Claims 9 to 12 inclusive.

13. Apparatus according to claim 8, in which said mandrel has an axial through passage for the delivery of blowing air to parison.

14. Apparatus according to claim 8, including a pair of mold sections positioned to received the parison as it is extruded.

15. Apparatus according to claim 10, in which the mandrel has an axial through passage for the delivery of blowing air to the parison, said appartus including also a pair of mold sections positioned to receive the parison as it is blown.

OATH, POWER OF ATTORNEY, AND PETITION

Being duly sworn, I, JACK H. HOFSTETTER depose and say that I am a citizen of the United States of America residing in Anaheim, County of Orange, State of California; that I have read the foregoing specification and claims and I verily believe I am the original, first, and sole inventor of the invention or discovery in METHOD AND APPARATUS FOR PRODUCING BLOW MOLDED OBJECTS described and claimed therein; that I do not know and do not believe that this invention was ever known or used before my invention or discovery thereof, or patented or described in any printed publication in any country before my invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this [fol. 13] application; that this invention or discovery has not been patented in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months before this application; and that no application for patent on this invention or discovery has been filed by me or my representatives or assigns in any country foreign to the United States, except as follows: NONE.

And I hereby appoint WHITE & HAEFLIGER, Registration No. 19,037, 611 Wilshire Boulevard, Los Angeles 17, California, my attorney or agent with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, oath, power of attorney, and this petition, this 17th day of January, 1962.

Inventor JACK H. HOFSTETTER
First Name Middle Initial Last Name

Address 2511 East Romneya Drive
Anaheim, California

State of California)
) ss.:
County of Los Angeles)

Before me personally appeared JACK H. HOFSTETTER, to me known to be the person described in the above application for patent, who signed the foregoing instrument in my presence, and made oath before me to the allegations set forth therein as being under oath, on the day and year aforesaid.

BEA EUGUM
Notary Public
In and for the County of Los Angeles,
State of California
My Commission Expires July 5, 1963

[SEAL]

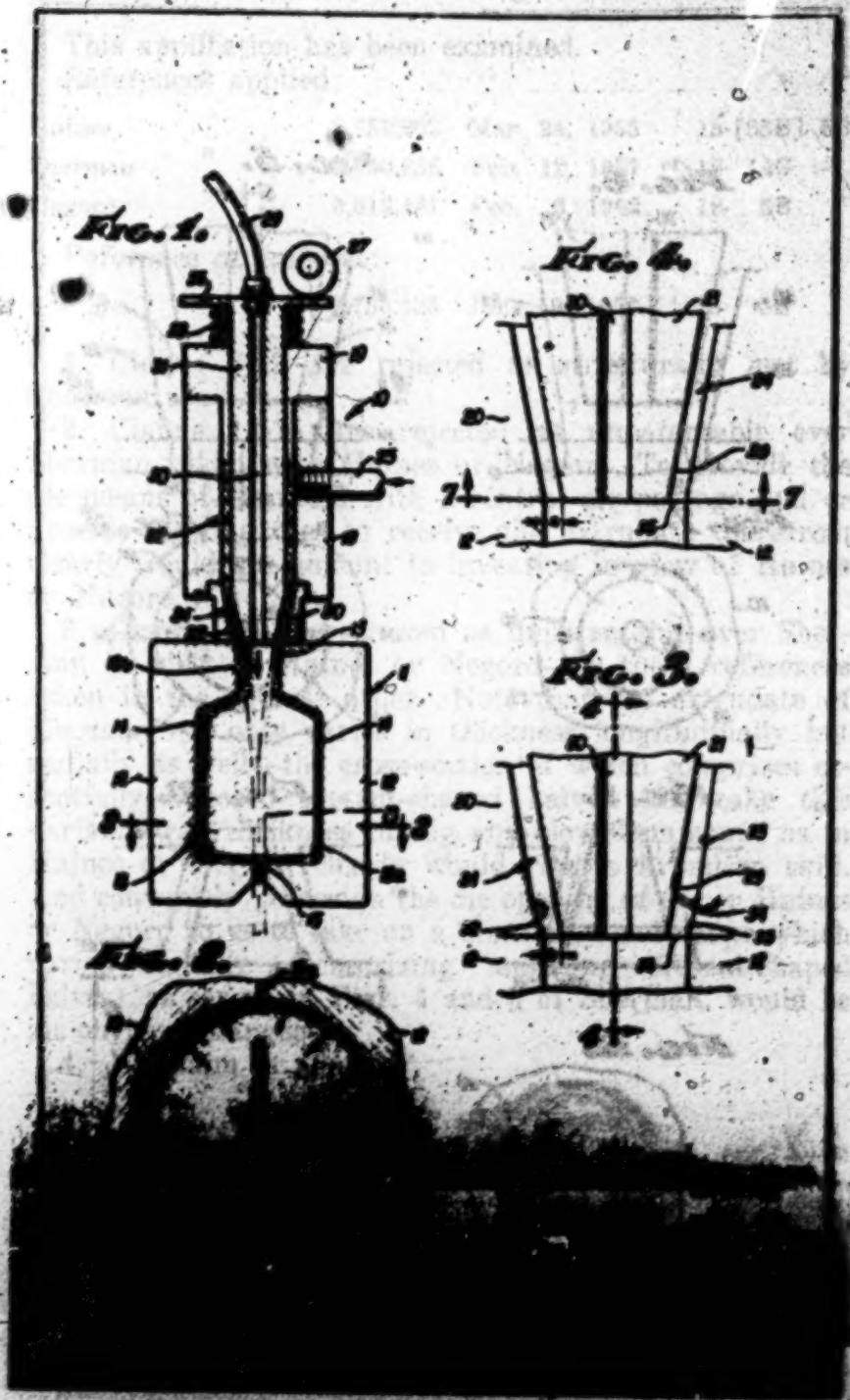
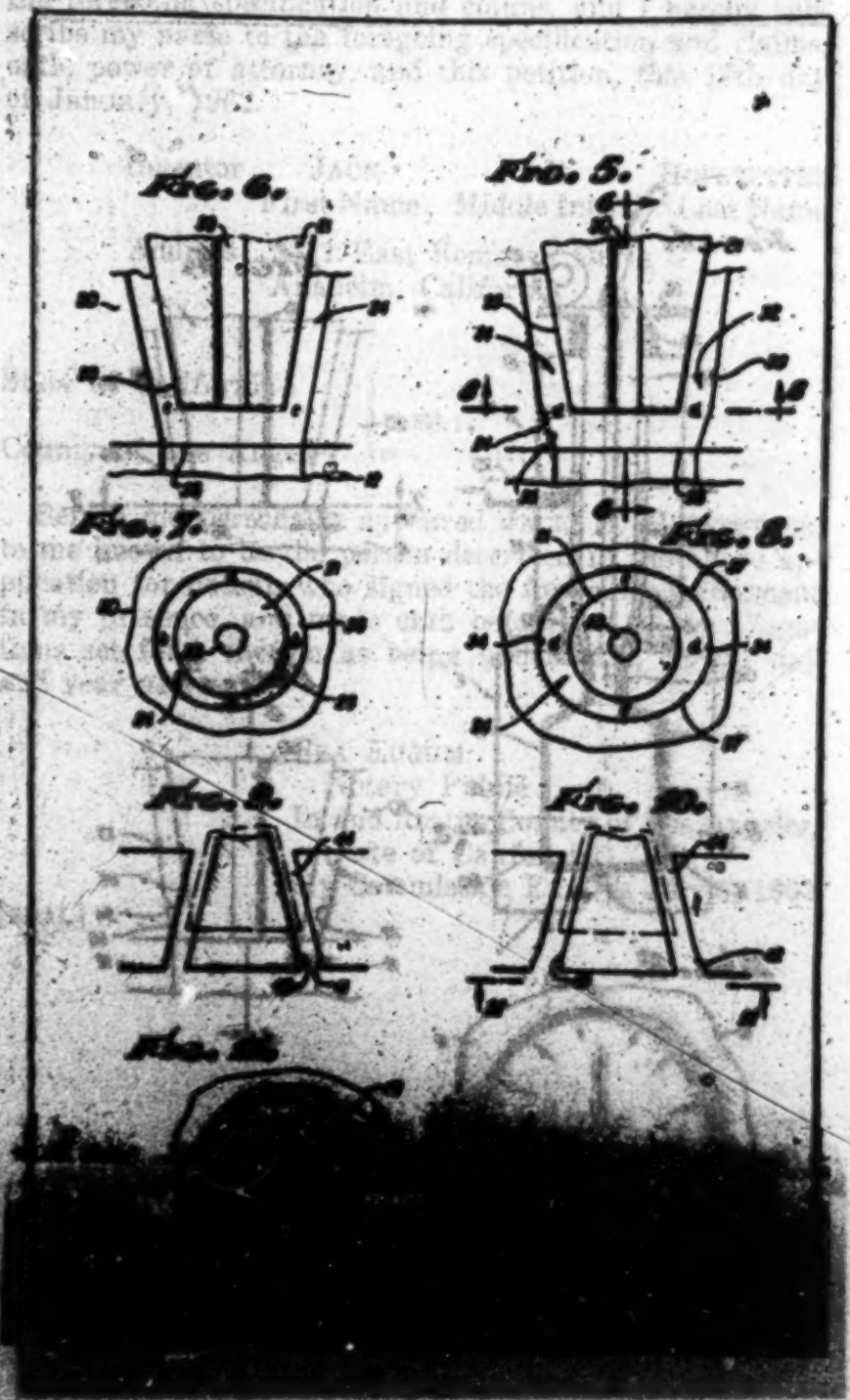


FIG. 1.
FIG. 4.
FIG. 3.
FIG. 2.

14

[fol. 17]

172543



[fol. 19]

Letter of Examiner, August 14, 1962

This application has been examined.
References applied:

Haines	2,632,202	Mar. 24, 1953	18-[55B] 5B
Sherman	2,780,835	Feb. 12, 1957	18- 14G
Negoro	3,019,481	Feb. 6, 1962	18- 5B

Reference of interest:

Colombo	2,750,625	June 19, 1956	18- 5B

1. Claims 8-12 are rejected as structurally met by Sherman.

2. Claims 13-15 are rejected as unpatentable over Sherman taken with Haines or Negoro. To provide the die means of Sherman with a central air passage and/or provide blowing dies to receive the extrudate therefrom clearly would not amount to invention in view of Haines or Negoro.

3. Claims 1-7 are rejected as unpatentable over Sherman in view of Haines or Negoro—or these references taken in the reverse order. Note that the extrudate of Sherman not only varies in thickness longitudinally but radially as well—the cross-section of which comprises essentially opposed crescent-shaped halves. To take this variable wall thickness tubing and blow-form same, as in Haines or Negoro, clearly would rise to invention skill. And conversely, to design the die opening of either Haines or Negoro so as to take on a cross sectional shape which varies radially (comprising matching crescent-shaped halves) as shown in Figs. 4 and 5 of Sherman, would be an obvious changeover.

4. No claim is allowed.

M. V. BRINDISI
Examiner

[fol. 20] Amendment, January 29, 1963

Los Angeles, California
January 22, 1963

The Commissioner of Patents
Washington 25, D. C.

Sir:

In response to office action dated August 14, 1962, kindly amend the case as follows:

In the Claims:

Claim 1, line 16, strike the period and add a comma.
Claim 1, at the end add the following paragraph:

—

(3) internally blowing said parison extent to conformance with the inside walls of said mold so as [A¹] to cause the greater thickness of said parison wall

B

at opposite sides of said plane to expand approaching the lesser thickness of said blown parison wall in said plane.

—

Claim 8, line 12, delete "and".
Claim 8, line 15, strike the period and add —

and a pair of molding sections positioned to receive A² said parison upon extrusion, and means for 20 blowing air to said parison for expanding same to conformance with the inside walls of said A² molding section.

—

Claim 13, line 1, following "said", add —means for blowing air comprises—.
Claim 13, line 2, delete "mandrel has".

[Matter enclosed between heavy rules erased in copy.]
[Matter enclosed between brackets erased in copy.]

[fol. 21] Claim 13, line 12, following "passage", add — in said mandrel—.

Cancel claims 4, 14 and 15, without prejudice.

REMARKS

* * * *

Respectfully submitted,

WHITE & HAEFLIGER
Attorneys for Applicant

Letter of Examiner, April 25, 1963

This is in response to the amendment filed January 29, 1963.

1. Claims 1-3 and 5-13 are in the case, claims 4, 14 and 15 having been cancelled.

2. Claims 1-3 and 5-7 are rejected as unpatentable over Sherman in view of Haines or Negoro or these references taken in reverse order for the reasons given in the last Office action. Applicant argues that Sherman does not show bottle blowing but bottle blowing is shown by Haines and Negoro. Applicant argues that Haines and Negoro do not show circular variance in tube wall thickness but this is shown by Sherman. It is held that there would be nothing unobvious in combining the teachings of these references whereby the claimed method would be obtained.

3. Claims 8-13 are rejected as unpatentable over Sherman taken together with Haines or Negoro for the reasons given in paragraph 2 of the last Office action. Applicant's argument against this rejection and the answer thereto is the same as indicated above. Whether the die or the mandrel is shaped to provide the claimed greater spacing is a matter of choice. It would not be unobvious to combine the teachings of the references.

This action is made FINAL.

M. LIEBMAN
Examiner

[fol. 22]

Appeal to Board of Appeals, May 27, 1963

Los Angeles, California
May 24, 1963

The Commissioner of Patents
Washington 25, D. C.

Sir:

Applicant hereby appeals to the Board of Appeals from the decision of the principal examiner finally rejecting all of the claims remaining in the case.

Oral hearing is waived.

Respectfully submitted,

WHITE and HAEFLIGER
Attorneys for Applicant

Amendment, June 26, 1963

Los Angeles, California

The Commissioner of Patents
Washington 25, D. C.

Sir:

Claim 1, rewrite the insertion previously entered after line 16 to read as follows:

(3) internally blowing said bottom forming parison extent to conformance with the inside walls of said B' mold so as to cause the greater thickness of said parison wall at opposite sides of said plane to expand approaching the lesser thickness of said blown parison wall in said plane.

REMARKS

Upon reconsideration of claim 1 in connection with the appeal, and although no indefiniteness has been noted by [fol. 23] Examiner, it appears that the form of the claim may be improved by insertion of the words "bottom forming" in the insertion after line 16 in claim 1, to distinguish the parison extent referred to in the insertion, from the parison extent to which previous reference is made in line 8.

The present amendment does not affect in any manner the scope of the claim, but merely improves it as to form.

Respectfully submitted,

WHITE & HAEFLIGER
Attorneys for Applicant

Brief, June 26, 1963

Appeal is taken from the final rejection of all the claims now standing in the application, reproduced below with underscorings of certain limitations which, as will develop, clearly distinguish the invention from any warranted interpretations of the cited art:

• • • •

For Claims 1 to 3 inclusive, and 5 to 12 inclusive, see Rejected Claims 1 to 3 inclusive, and 5 to 12 inclusive.

• • • •

For Claim 13, see Rejected Claim 13.

PRELIMINARY OBSERVATION

Believing the rejection to be totally unsupportable, applicant filed on May 8, 1963, Paper No. 7, as a request for reconsideration of the rejection. While the arguments more briefly presented in the request for reconsideration, should alone suffice to show the Examiner's position to be in error, we will now treat the issue in somewhat greater detail in furtherance of the belief that if the true nature of the invention and its relation to prior art are fully

[fol. 24] appreciated, there can be no question that applicant has made an inventive advance over anything even remotely suggested by the patents cited.

It is believed that the accompanying amendment may be in order for relieving any indefiniteness in step (3) of method claim 1.

THE INVENTION

For the purpose of distinguishing the present invention from prior art known to applicant at the time of filing, it was explained with reference to prior practices, on page 2 that:

> "It has been recognized that to blow mold a tubular parison having uniform wall thickness for the formation of such containers, would result in such variances in wall thicknesses as to unacceptably weaken (because of thinness due to large diameter expansion) the enlarged lower or bottom extent of the container, assuming the parison wall thickness to be reasonably economical for the formation of the smaller diameter or neck portion of the container. If the parison wall thickness is increased to allow for adequate wall thickness and strength of the large diameter portion of the container, then the container becomes uneconomical because of excessive plastic consumption in forming the neck portion with wall thickness greater than is necessary."

Having so stated the problem, applicant proceeded to acknowledge what had been proposed in the past with respect to extrusion, for blow molding, of successive parison lengths with different but respectively uniform wall thicknesses, and to explain wherein the particular condition occasioned by flattening of the parison at the mold parting line, precluded enlarged bottom container blowing ultimately to uniform wall thickness, starting with circular uniformity in the wall thickness of the corresponding parison extent, even though that thickness be increased [fol. 25] beyond the parison length blown to form the smaller container neck portion.

"In recognition of this problem, it has been proposed in the past to extrude successive lengths of the parison with different wall thicknesses, the greater thickness extent being expanded to form the large diameter portion of the container, with the lesser wall thickness of the parison expanded to form the lesser diameter or neck extent of the container. This expedient accomplishes to a degree, plastic distribution in the blown container in keeping with the practical requirements of different diameter wall thicknesses, but it does not afford desirable uniformity, or strength, in certain areas in the large diameter bottom extent of the container wall, because of the parison expansion in relation to the manner in which the parison is confined by the mold. This condition arises because the container bottom-forming end of the parison is pinched together between and along the parting line of the mold sections, so that blowing conformance of the parison to the mold involves relatively great displacement and stretching normal to the parting line, but much lesser displacement and stretching in the direction of the parting line. As a consequence, the parison wall thickness is reduced much more greatly in blowing to a diameter normal to the parting line, and in order to afford adequate wall thickness at that diameter, unnecessary wall thickness would exist at the parting line diameter. (Underscoring added)

Applicant then proceeded on page 3 to explain what appears to be his clearly novel concept of assuring adequate thickness in the blown large diameter container wall, and generally normal to the parting line of the mold, by extruding the parison with *circularly varying* wall thickness, and with that variance in predetermined (opposite side) relation to the mold parting line or plane.

"The present invention has for its primary object to effect distribution of the parison plastic in a manner [fol. 26] that will overcome the last discussed difficulty by providing adequate material for container strength

at the blown diameter normal to the parting line, while limiting plastic usage to only that required for the wall thickness in the axial plane of the parting line, all to the end of meeting the strengths requirements of the enlarged portion of the container while avoiding excessive plastic consumption. The invention employs the prior proposal of extruding successive lengths of the parison at different wall thicknesses, but contemplates certain new concepts with respect to circular distribution of the plastic material in that portion of the parison that forms the bottom or enlarged diameter extent of the container." (Underscoring added)

THE CITED ART

Examiner relies on Sherman, in view of or taken together with, Haines or Negoro. These latter two references typify exactly applicant's acknowledgements in the specification of prior practices or proposals to blow and expand within reduced and enlarged diameter portions of mold cavities, parisons extruded to have respectively thinner and thicker successive lengths but individually of uniform wall thickness. Examiner apparently does not dispute this, and consequently there appears to be no point in burdening this brief by detailed explanation of the references. However, it is pertinent to observe that neither reflects any recognition of the flattened condition of a tubular parison terminally pinched between coplanar mold surfaces or edges, or more specifically, any recognition of the fact that the resulting closure approach to the mold surfaces of the flattened side edges or portions of the parison, will result in differential thinning of the parison wall upon blowing, so that assuming economical adequacy of wall thickness at the parting line plane, the expansion of the parison to the farther reaches of the cavity surfaces normal to that plane, would result in ex-
[fol. 2?] cessive thinning of the corresponding portions of the container wall. Thus it is no solution to uniformly thicken the container bottom-portion forming section of the parison, because the inevitably differential expansion must result in the wall thickness being uneconomically

excessive at the parting plane if the outer wall thickness normal thereto is adequate, or that if the parting plane thickness is no more than that required, the outer thickness normal to the plane must be inadequate.

Examiner apparently does not dispute these propositions, but contends that applicant's teachings having to do with circular variance in the parison wall thickness would be obvious in view of Sherman to those skilled in the art taught by Haines and Negoro. Now we submit this to be factually and legally a totally unwarranted interpretation of any significance in Sherman to the art of blow molding, and particularly for solution of the problems presented and solved by applicant.

Even a cursory review of the Sherman patent will show that it has to do simply with the extrusion of plastic tubes with circularly varying wall thicknesses, but without the slightest concept of employing such variances for purposes of blow molding as in keeping with applicant's objectives. It seems so unrealistic as to defy any necessity for serious or protracted refutation, to assume that anyone however skilled in the art, observing Sherman's purposely thickening of opposed plastic tube walls *in a final product to be so formed*, would suggest doing away with such thickening for a totally different purpose of accomplishing or approaching uniformity of wall thickness in a *blown plastic container*.

THE REJECTION

The inconsistency of Examiner's position is apparent in the final rejection itself. After asserting that bottle blowing is shown by Haines and Negoro, and apparently recognizing that these references show only longitudinally varied, but circularly uniform thickness parison blowing, [fol. 28] Examiner says that circular variance in tube wall thickness is shown by Sherman. It should be unnecessary to observe that applicant makes no claim to the mere extrusion of a plastic tube having circular variance in its wall thickness. Examiner continues by holding "that there would be nothing unobvious in combining the teachings of these references whereby the end method would be obtained". We have previously urged upon Examiner the proposition that one is not privileged to so interpret a

reference, as has been done in this case, to read into it something with which it is totally unconcerned, much less indulge in an assumption which would go to defeat the very objects and identities of the reference itself. Certainly it cannot be seriously contended that Sherman contemplates container blowing, or any operation that would result in production of a tube or any other body of uniform wall thickness. Again we point out that Sherman has neither made nor contemplated any contribution to the blow molding of plastic containers in a manner productive of uniformity in wall thicknesses, but instead is simply concerned with extruding a non-uniform thickness plastic tube as a final or end product.

The same general considerations apply to the rejection of claims 8 to 13.

THE CLAIMS

In reference to method claims 1-3 and 5-7, we have emphasized the recited step of extruding the bottom-forming extent of the parison *"of wall thickness at opposite sides of said plane which is greater than the first mentioned wall thickness and greater than the wall thickness of the last mentioned extent of said plane"*.

Not one of the cited references shows or suggests any concept of so forming the parison wall thickness in relation to any mold plane, or of utilizing that relation for producing uniformity in a container wall formed by expansion of the parison. So what justification there may be in the Examiner's position is most difficult to understand.

[fol. 29] Equally difficult is an understanding of wherein the references reflect the remotest concept of expanding *"crescent-shaped increases"* in parison wall thicknesses at opposite sides of the plane. Such a relation is simply nonexistent in the cited art.

Similar considerations apply to the limitation in claim 8, requiring that in the "another relative axial mandrel position" there is greater spacing *"which increases at opposite ends of said plane"*, the foregoing in combination with the mold sections and blowing means whereby the

stated spacing is used in a manner uniquely related to parison expansion to the form of a blown container.

CONCLUSION

We believe it to be a valid observation that the Examiner's position is so totally unrealistic in fact and in law as to have placed on applicant a clearly undeserved burden in having to take this appeal.

Respectfully submitted,

WHITE & HAEFLIGER
Attorneys for Applicant

Examiner's Answer, October 9, 1963

This is an appeal from the final rejection of claims 1-3 and 5-13. No claim has been allowed.

A correct copy of the appealed claims appears on pages 1-4 of applicant's brief except for the following: underlining has been added to claims 1, 2, 7, 8 and 9; brackets and an asterisk have been added to claim 1; and in claim 8, line 10, "axial" has been misspelled.

The amendment filed June 26, 1963 has been entered.

The references of record relied on are:

Sherman	2,780,835	Feb. 12, 1957
Haines	2,632,202	Mar. 24, 1953
Negoro	3,019,481	Feb. 6, 1962

[fol. 30] The subject matter of this application pertains to a process and apparatus for making hollow plastic containers such as bottles. The process comprises extruding molten plastic to form a tube. (The tube, which is a blank from which the product is made, is sometimes called a "parison"). The tube is enclosed within a mold and air is then forced into the tube to expand the tube into conformity with the mold. This much of the process is standard procedure.

Applicant finds that the ultimate product is not of uniform wall thickness, the thickness portions of the product corresponding to those portions of the blank which are

moved the shortest distance by the blowing step and the thinnest portions of the product corresponding to those portions of the blank which are moved the greatest distance by the blowing step. (See distances "X" and "Y" in Fig. 2 of applicant's drawing.) This non-uniformity in the ultimate product can be eliminated, according to applicant, by making the tubular blank, from which the product is blown, of non-uniform thickness. Specifically, those portions of the blank which are moved the least by the blowing step are made thinner and those portions of the blank which are moved the most by the blowing step are made thicker. In a preferred modification, a transverse cross-section through the tubular blank, has a shape somewhat like two oppositely facing crescents.

The apparatus comprises a tube extruder, a pair of mold halfs and means for blowing air into the tube. The extruder comprises a die, a mandrel within the die passageway, and means for moving the mandrel axially in the die passageway. The die passageway is noncircular so as to form with the mandrel an annular tube forming orifice which will produce a tubular blank of the desired cross-section.

THE REFERENCES

The patent to Haines shows a process and appartus for forming hollow plastic contai....s by the well known ex-[fol. 31] trusion/blowing techniques. The ultimate products in Haines are made so as to have uniform wall thickness without weakness or waste of material. This is achieved by extruding the tubular parison blank of such a shape that those portions of the blank that are moved the most by the blowing step are the thickest and those portions of the blank that are moved the least by the blowing step are the thinnest with gradations in-between. (See Fig. 2, numeral 44 in Haines.) Haines shows apparatus for forming hollow containers comprising a plastic tube extruder, a pair of mold halfs and means for blowing air into the tube. The tube extruder comprises a die having a passageway, a mandrel axially moveable within the passageway thereby forming an annual orifice of varying thickness.

The Negoro patent shows a process and apparatus for forming hollow plastic containers of uniform wall thickness in a manner and using apparatus as described in connection with the Haines patent. The part of the tubular blank that is moved (displaced, expanded) the greatest by the blowing step is the thickest, the part of the tubular blank that is moved the least, is the thinnest. (See Figs. 6 and 7 of Negoro..)

The Sherman patent shows a method and apparatus for extruding plastic to form tubes, particularly tubes having crescent shaped thickened portions on opposite sides of the tube. The plastic tube extruding apparatus comprises a die fitted with an axially movable mandrel to vary the thickness of the extruded tube.

THE REJECTION

Claims 1-3 and 5-7 stand finally rejected as unpatentable over Sherman in view of either of Haines and Negoro and, as unpatentable over either of Haines and Negoro in view of Sherman. It would be obvious to blow mold the tube of Sherman which has crescent-shaped thickened portions to obtain bottles in view of Haines and Negoro. It would be obvious to extrude and blow mold a tube [fol. 82] having [blowing] crescent-shaped thickened portions thereon in the process of Haines or Negoro in view of Sherman.

Claims 8-13 stand finally rejected as unpatentable over Sherman taken together with Haines or Negoro. Nothing unobvious would be involved in adding to the apparatus of Sherman a pair of bottle molding halves and means for blowing air into the tube extruded in Sherman in view of Haines or Negoro. Nor would anything unobvious be involved in using a dual crescent shaped orifice in the apparatus of Haines or Negoro in view of Sherman.

RESPONSE TO ARGUMENTS

No step of pinching the tubular parison blank is found in applicant's method claims and no means for pinching the tubular parison blank is found in applicant's appara-

---

[Matter enclosed between rules erased in copy.]

tus claims. The language "circularly varying" does not appear in any of the claims. Applicant appears to argue that these terms are important. Even if the claims are interpreted to include these limitations. (the claims are not so understood by the Examiner) it is held that rejections would still be proper. This is because each of Haines and Negoro teach the concept of blowing a non-uniformly shaped tubular parison blank to obtain a bottle of uniform wall-thickness, that the blank should be thickest at those places expanded the greatest and vice versa. Each of these references uses a pinching blow mold.

Sherman (Orville B. Sherman) is a well known inventor in the bottle *blow molding* art. Furthermore, when one seeks to make changes in the tube extrusion part of the extrusion-blow molding art he would be remiss if he did not look to the tube extrusion art.

Respectfully,

A. H. BRODMERKEL
Acting Examiner

[fol. 33] Reply Brief, October 17, 1963

Examiner's attempts to justify the untenable rejection given in this case, result in such magnifications of the fault as we find in the arguments presented under "THE REJECTION".

Examiner states "It would be obvious to blow mold the tube of Sherman which has crescent-shaped thickened portions to obtain bottles in view of Haines and Negoro."

After applicant's endeavor to set forth in the specification the problems encountered in achieving proper wall thicknesses in blow molding containers "of reduced diameter upper portion and enlarged bottom diameter", as the method claims recite, it is surprising to encounter the apparent lack of understanding reflected in the assumption that all that would be required is to blow mold a parison shaped according to Sherman. Ignoring for this point of argument the fact that Sherman has nothing to do with blow molding, it is difficult to understand how

possibly the Examiner can disregard the fact that the claims require according to step (1) extruding one extent of the parison having at opposite sides of the previously identified plane at lesser wall thickness to form the reduced diameter portion of the container, and then, according to step (2), extruding another extent of the parison "of wall thicknesses at opposite sides of the plane which is greater than the first mentioned wall thickness of the last mentioned extent in said plane".

As we have repeatedly urged, and as Examiner apparently agrees, neither Haines nor Negoro reflects any contemplation of the form in which applicant's parison is extruded, speaking in terms of *the parison itself* and according to *the claims*. So it would seem incumbent upon the Examiner to explain just how he would propose to meet the claim requirements by the showing in Sherman of a tubular extrusion, whether or not we call it a parison, which also lacks that form in that it *remains at uniform cross sectional shape*. Using Examiner's own words, [fol. 84] how possibly could anyone "blow mold a tube having a crescent-shaped thickened portions thereon in the process of Haines or Negoro in view of Sherman" and arrive at applicant's method?

The references are not even pertinent to the extent of relating relatively thinner and thicker parison thicknesses to the mold plane at which the walls of the parison are pinched together. Would Examiner blow mold the same Sherman "parison" to form both the reduced neck and enlarged body of the container? And if not, just where in Haines or Negoro would he find any reference to the combination of steps as *particularly defined* in (1) and (2) of the method claims.

The same general considerations apply to the rejection of apparatus claims 8 to 18.

Under "RESPONSE TO ARGUMENTS" Examiner states that "No step of pinching the tubular parison blank is found in applicant's method claims and no means for pinching the tubular parison blank is found in applicant's apparatus claims." But later, after reference to Haines and Negoro, Examiner states that "Each of these references uses a pinching blow mold."

As to the method claims, it becomes apparent therefore that there is no novelty *per se* in the step of pinching a parison between mold sections, and accordingly there appears to be no impropriety, or lack of certainty, in defining the method in terms of its environment, which is clearly spelled out in the preamble to the method claims wherein it is explained that the mold acts to "pinch together" the walls of the parison in an axial plane of the formed container.

As to the apparatus claims, the recitation of "molding sections positioned to receive the parison", should suffice to recite any structure needed for mold definition. However broadly the multi-section mold is defined, the fact remains that Examiner has cited no parison extrusion apparatus capable of satisfying otherwise the requirements of claims 8 to 13.

[fol. 35] Interesting is Examiner's departure from the record in stating that "Sherman (Orville B. Sherman) is a well known inventor in the bottle *blow molding* art", which is supposed to support the assertion that "when one seeks to make changes in the tube extrusion part of the extrusion-blow molding art he would be remiss if he did not look to the tube extrusion art". We say that the Examiner is remiss in not having taken a good look at what Sherman actually shows in extruding a tube, as contrasted with the different concepts and extrusion steps taken by applicant, respectively to meet the requirements of blow molding the reduced neck and enlarged bottom portions of the container. Since, according to Examiner, Mr. Sherman is expert in both extruding and blow molding, the only logical conclusion is that if he disclosure had anything to do with blow molding Mr. Sherman would have said so.

Examiner's arguments do not appear to improve the unsoundness of the rejection.

Respectfully submitted,

WHITE & HAEFLIGER

Attorneys for Applicant

Decision of Board of Appeals, April 30, 1964

Before ROSA, Examiner-in-Chief, and HULL and BRONAUGH, Acting Examiners-in-Chief.

HULL, Acting Examiner-in-Chief.

This is an appeal from the decision of the Examiner finally rejecting claims 1, 2, 3 and 5 through 13. No claim has been allowed.

Claim 1 is illustrative and is reproduced as follows:

1. In the formation of reduced diameter upper portion and enlarged bottom diameter containers by extruding a tubular parison and expanding the parison by internal air pressure within a mold comprising a pair of cavitated sections adapted to pinch together [fol. 36] the walls of the parison along a bottom diameter in an axial plane of the formed container, the method that includes:

(1) extruding one extent of the parison having at opposite sides of said plane a relatively lesser wall thickness throughout a length of the parison which forms said reduced diameter portion of the container, and

(2) extruding another container bottom-forming extent of the parison of wall thicknesses at opposite sides of said plane which is greater than the first mentioned wall thickness and greater than the wall thickness of the last mentioned extent in said plane,

(3) internally blowing said bottom forming parison extent to conformance with the inside walls of said mold so as to cause the greater thickness of said parison wall at opposite sides of said plane to expand approaching the lesser thickness of said blown parison wall in said plane.

The references of record relied upon are:

Haines	2,632,202	Mar. 24, 1953
Sherman	2,780,835	Feb. 12, 1957
Negoro	3,019,481	Feb. 6, 1962

The claimed subject matter relates to the method and apparatus for making hollow plastic containers such as bottles and is adequately described on pages 1 and 2 of the Examiner's Answer.

The references of record are adequately described on pages 3 and 4 of the Examiner's Answer.

Claims 1, 2, 3, 5, 6 and 7 stand rejected as unpatentable over Sherman in view of either Haines and Negoro or as unpatentable over either Haines and Negoro in view of Sherman. The Examiner takes the position it would be obvious to blow mold the tube of Sherman which has crescent-shaped thickened portions to obtain bottles in view of the method steps taught by Haines or Negoro. [fol. 37] Conversely, the Examiner holds the references may be reversed and if this were done, it would be obvious to extrude and blow mold a tube having crescent-shaped thickened portions thereon such as taught by Sherman in the process of either Haines or Negoro.

Appellant argues in his brief and reply brief, in essence, that the claims are patentable over the cited references because Sherman does not contemplate container blowing but only extruding a nonuniform thickness plastic tube as his end product. Appellant further notes that Haines and Negoro add nothing since they merely typify the state of the prior art exactly as acknowledged by appellant in the specification. Finally, appellant notes these is no teaching in the record to combine the references in the manner suggested by the Examiner.

Appellant's arguments have been carefully considered, but are not convincing of any error in the rejection. After carefully considering the prior art, we hold that the instant claims are unpatentable over Haines or Negoro in view of Sherman. Both Haines and Negoro clearly teach forming a tube of nonuniform wall thickness and placing this tube in a mold where it is blown into a container of uniform wall thickness. This is the concept that appellant is claiming and it is taught by Haines and Negoro. Sherman teaches extruding a tube of crescent-shaped thickened portions thereon and to modify the tubes of either Haines or Negoro to include this teaching of Sherman would be a mere matter of choice and design. We note

that the Examiner has also rejected the instant claims as unpatentable over Sherman in view of Haines or Negoro and while we prefer to rely on Haines or Negoro as our basic reference we find no error in this rejection. Under these conditions, we conclude that claims 1, 2, 3, 5, 6 and 7 are not patentable over the references cited.

Claims 8 through 13 stand rejected as unpatentable over Sherman in view of either Haines or Negoro or as unpatentable over either Haines or Negoro in view of Sherman. The Examiner takes the position the claims are [fol. 38] readable on the apparatus of Sherman when combined with the container molding halves and means for blowing air into the extruded tube taught by either Haines or Negoro. Further, as with the method claims above, the Exaimner holds the references may be reversed and if this is done, it would be obvious to use the dual crescent-shaped orifice of Sherman in the apparatus disclosed by Haines or Negoro.

Appellant argues in his brief and reply brief, in the main, that claims 8 through 13 are patentable over the references cited for substantially the same reasons as were advanced with respect to claims 1, 2, 3, 5, 6 and 7, above. Appellant concludes by noting the Examiner has cited no parison extrusion apparatus capable of satisfying the requirements of claims 8 through 13.

Appellant's arguments have been carefully considered, but for the reasons indicated above, as well as those set forth on pages 4 and 5 of the Examiner's Answer, with which we agree and incorporate herein by reference, we conclude that claims 8 through 13 are not patentable over the references cited.

The decision of the Examiner is affirmed.

AFFIRMED

Request for Reconsideration, May 20, 1964

The Board of Appeals is respectfully requested to reconsider its decision of April 30, 1964, holding the appealed claims to be unpatentable over the Haines or Negoro in view of Sherman, or on Sherman in view of Haines or Negoro.

The basis for this request is that the Board of Appeals' decision apparently misconstrues, or does not factually take into account, the actual workings of the references, or what we believe to be the inescapable conclusion that however interpreted, individually or collectively, the references reflect not even a conception, much less accomplishment, of applicant's objectives.

The essence of the decision appears to be expressed in the following on page 3:

[fol. 39] "Appellant's arguments have been carefully considered, but are not convincing of any error in the rejection. After carefully considering the prior art, we hold that the instant claims are unpatentable over Haines or Negoro in view of Sherman. Both Haines and Negoro clearly teach forming a tube of non-uniform wall thickness and placing this tube in a mold where it is blown into a container of uniform wall thickness. This is the concept that appellant is claiming and it is taught by Haines and Negoro. Sherman teaches extruding a tube of crescent-shaped thickened portions thereon and to modify the tubes of either Haines or Negoro to include this teaching of Sherman would be a mere matter of choice and design."

There is error in concluding that Haines and Negoro "teach forming a tube of non-uniform wall thickness and placing this tube in a mold where it is blown into a container *of uniform wall thickness*". Starting with an enlarged diameter body-forming extent of the parison that in itself has uniform wall thickness, *non-uniform* expansion of this parison extent to the enlarged body diameter *must necessarily result in non-uniform wall thickness*. As applicant has explained in the specification, the parison expansion and effect on wall thickness *are different at the mold parting or pinch-off plane, in relation to the wall condition in a transverse plane generally normal to that line*. Consequently, when either in Haines or Negoro a uniform thickness parison extent is blown to the enlarged body diameter normal to the parting line plane, initially uniform parison thickness and the geometry of the blowing must necessarily dictate thinning out in the normal plane, and if the wall thickness at the parting line is no

more than is required for strength, the bottle must necessarily become weakened by excessive wall thickness reduction at the extremes of expansion. Accordingly, it is respectfully submitted that the statement in the decision as quoted above, is factually erroneous.

[fol. 40] It is believed that upon reconsideration, the Board will recognize that the Haines and Negoro concept is not "the concept that applicant is claiming and is taught by Haines and Negoro". In a sense, the exact opposite is true. Haines and Negoro vary the parison thickness longitudinally, *but that fact in itself will not permit circular uniformity in expanded body wall thickness*, a realization taught by applicant and either ignored or not realized by Haines or Negoro.

The decision then continues by concluding that to include "this teaching of Sherman would be a mere matter of choice and design." We respectfully disagree. In the first place both Haines and Negoro are predicated upon circular uniformities respectively of the two parison lengths that form the neck and body of the bottle. With reference to the neck formation, could it logically be concluded that either Haines and Negoro, being concerned with utilization of correct plastic thickness that would be required for the neck formation, would deliberately employ Sherman's excess thicknesses, with consequent wastage, when it is realized that minumum but adequate thicknesses must be maintained for economy? Further, if Sherman's parison were to be used in Haines or Negoro, wherein does either reference constitute any suggestion or teaching as to where the Sherman thicknesses would be oriented in relation to the parting plane of the mold? Any suppositions must be unrealistic because of the complete absence of applicant's concept which could be the only basis for assuming how to effect such orientation, even if it were possible and warranted by the legal supposition that it is proper to completely destroy the identity of Sherman in order to make out an asserted combination between Haines-Negoro and Sherman. The basic fault is that applicant's concept is completely lacking in the references.

The same considerations apply to the apparatus claims because however interpreted, the art simply does not show

parison extrusion at circularly varying thickness, and blowing opposed greater thicknesses to an enlarged dia-
[fol. 41] meter normal to the parting plane of a mold which receives the parison, thus to achieve a uniformity in wall thickness which is the exact opposite of Sherman as an end product, and which, as we have explained, cannot result from either Haines or Negoro's expanding to enlarged diameter a circularly uniform-parison thickness.

To summarize, in no instance does the cited are disclose:

1. *Even a concept* of achieving uniformity in the expanded wall thickness of a container blown from a tubular parison within a pair of mold sections and to a diameter normally resulting in undesirable thinning of the wall thickness at the outer arcuate extents generally normal to the parting line of the mold sections.

2. Extruding a parison *circularly varying in thickness in a predetermined circularly oriented relation to the parting or pinching plane of the mold sections* between which the parison is received.

3. Receiving the parison as in (2), and expanding arcuately thickened sides of the parison *so that they reduce in thickness more greatly than*, and reach or approach correspondence in thickness with, *the initially thinner and less expanded sides of the parison in the mold pinch plane.*

Surely, to support valid rejection of the claims on the cited art, the references must contain at least some suggestion of (1), (2) or (3). In reality they contain not the slightest hint, and the features above could originate only in applicant's disclosure.

We submit that applicant has met every statutory and factual requirement for invention. It cannot be denied that:

A. The claimed method and aparatus are *new*, because nothing of the sort has been shown to be old.

B. That the invention is *useful* has not been questioned.

C. Applicant's invention cannot logically be held *obvious*, because it has not existed before in a highly developed art, and the only basis for denial has been what we

respectfully submit to be an untenable assumption that it would be obvious or apparent to expand and thin what [fol. 42] Sherman purposely does *not* expand and *leaves thick*, and in so doing to completely destroy the identity of the reference, its aims and actual form. It would seem to be a minimum requirement for pertinency, that Sherman at least relate to the formation of blow molded containers, because therein arise the problem and applicant's solution both of which are foreign to Sherman's product tube by its very nature.

The Board of Appeals is respectfully requested to reconsider its decision and to hold the appealed claims to be patentable over the cited art.

Respectfully submitted,

WHITE & HAEFLIGER
Attorneys for Applicant

Decision of Board of Appeals, June 11, 1964

Before ROSA, Examiner-in-Chief, and HULL and BRONAUGH, Acting Examiner-in-Chief

HULL, Acting Examiner-in-Chief.

Appellant's request for reconsideration of our decision of April 30, 1964 has been considered but is not convincing of error in our affirmance of the Examiner's rejection of claims 1, 2, 3 and 5 through 13 as unpatentable over the prior art.

We remain of the opinion that the prior art teaches the concept of achieving uniformity of wall thickness in a blown container from a tubular parison within a mold by varying the thickness of portions of the wall of the parison in accordance with the extent to which the portions of the parison are to be expanded in attaining the shape of the mold. In Haines, attention is directed to column 1, lines 9 to 21; column 3, lines 28 to 35; column 4, lines 11 to 29. Also, in Negoro, see particularly column 1, lines 35 to 43. The application of this concept as done by appellant is considered obvious.

[fol. 43] The request for reconsideration is granted in that we have reconsidered our decision but is denied as to any change therein.

Notice of Appeal to United States Court of Customs and Patent Appeals, July 10, 1964

Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

You are hereby notified of our appeal to the United States Court of Customs and Patent Appeals from the decision of the Board of Appeals rendered on or about April 30, 1964 rejecting the above-identified application and refusing to grant a patent for the invention disclosed therein and from the decision of the Board of Appeals rendered on or about June 11, 1964 denying a request for reconsideration as to any change in its prior decision. The following are assigned as reasons for the appeal:

1. The Board of Appeals erred in holding claims 1, 2, 3, 5, 6 and 7 unpatentable over Sherman Patent No. 2,780,835 in view of Haines Patent No. 2,682,202 and Negoro Patent No. 3,019,481, and as unpatentable over the Haines and Negoro patents in view of the Sherman patent.

2. The Board of Appeals erred in holding claims 8 through 18 as unpatentable over the aforesaid Sherman patent in view of the aforesaid Haines and Negoro patents and as unpatentable over the Haines and Negoro patents in view of the Sherman patent.

3. The Board of Appeals erred in holding the claims unpatentable over a combination of references when those references of themselves provide no suggestion of combining them.

4. The Board of Appeals erred in not giving weight to the fact that it was the applicant who discovered the problem associated with the methods and apparatus of the aforesaid Haines and Negoro patents and the inadequacies [fol. 44] of the products produced thereby, and that without knowledge of that discovery it would not have been

obvious to combine the teachings of those patents with the disclosure of the aforesaid Sherman patent.

5. The Board of Appeals erred in failing to consider the fact that the processes described in the aforesaid Haines and Negoro patents do not actually result in producing a plastic container of uniform thickness.

6. The Board of Appeals erred in holding the claims unpatentable over a combination of references when those references as combined do not disclose the claimed combination.

7. The Board of Appeals erred in holding that the method defined in claims 1-3 and 5-7 is obvious in view of the apparatus constructed by combining the disclosures of the cited patents without regard to the fact that the patents, even as combined, do not teach the steps and sequence of steps recited in these claims.

Respectfully submitted,

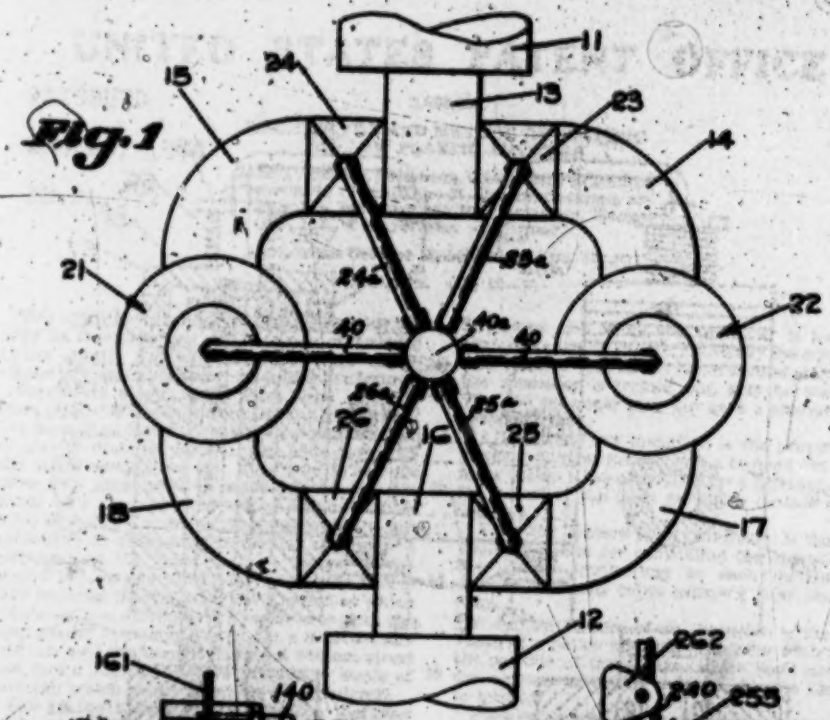
WHITE & HAEFLIGER
Attorneys for Jack H.
Hofstetter

[fol. 45]

March 24, 1953 J. R. HARRIS 2,632,202

Filed Oct. 19, 1950 MACHINE FOR AND METHOD OF FORMING HOLLOW PLASTIC ARTICLES

Fig. 1



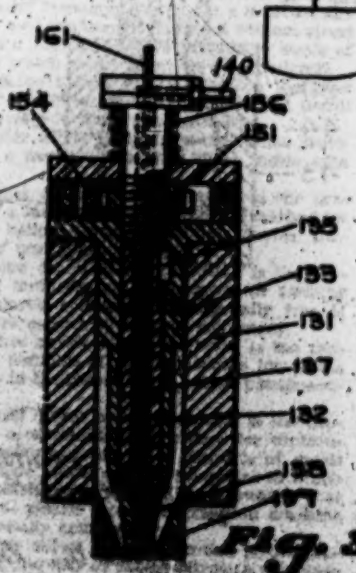


Fig. 3

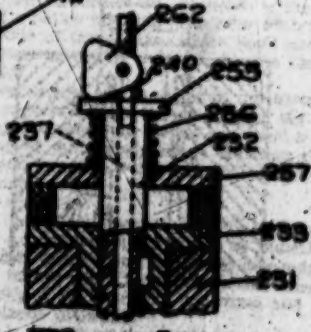


Fig. 4

INVENTOR
JOHN R. HARRIS
BY
JAMES R. Sox
ATTY.

42

[Vol. 47]

March 24, 1953 J. R. HAINES 2,632,202

MACHINE FOR AND METHOD OF FORMING HOLLOW PLASTIC ARTICLES

Filed Oct. 10, 1950 2 SHEETS—SHEET 2

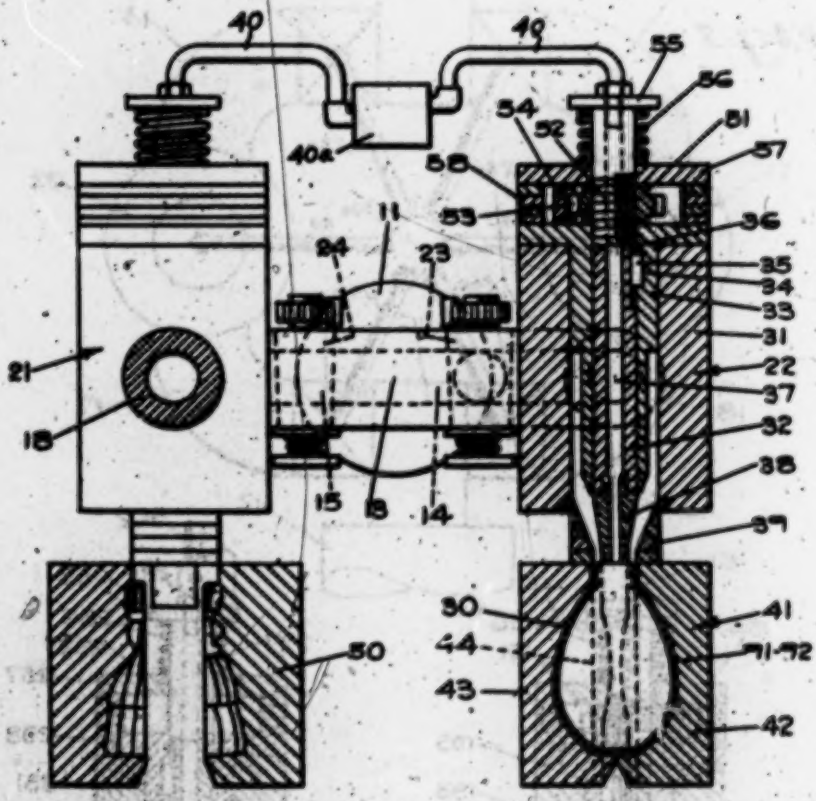


Fig. 2

Fig. 6

INVENTOR:
JOHN R. HAINES
BY
Jerome R. Box
ATTY.

Patented Mar. 24, 1953

2,632,202

UNITED STATES PATENT OFFICE

REISSUED

DEC. 16, 1958

RE. 24,377

[illegible]

MACHINE FOR AND METHOD OF [illegible] HOLLOW PLASTIC ARTICLES

John H. Hedger, Glencoe, and Mary E. Hedger, executrix of said John H. Hedger, deceased, assignors to Hedger Molding Company, Skokie, Ill., a corporation of Illinois

Application October 10, 1950, Serial No. 189,661

14 Claims. (Cl. 18—5)

1

The invention disclosed in this application relates to machines for and methods of forming hollow plastic articles and filling such hollow plastic articles immediately after they are formed.

Heretofore plastic tubes have been extruded from plastic extrusion machines, and plastic bottles have been formed by extruding pads or tubes of plastic material which have been blown by the use of compressed air. I propose to extrude tubes into appropriate parted molders to open molds and then to close the molds over these tubes and blow the tubes into the shape of hollow containers to said molds in regular succession. I propose that the molds shall be formed to the desired or that approximately correct shape that every material is supplied at such rapid or at such slower or less expensive rate required so that the final plastic container shall have a substantially uniform wall thickness throughout without sharp and abrupt and without unnecessary or waste of material which might otherwise be encountered.

One of the objects of my invention therefore is the provision of a new plastic molded article with [illegible] molded article, together.

A further object of my invention is the provision of a new machine for filling molds with plastic.

A further object of my invention is the provision of a machine capable of and a method for forming, hollow plastic containers having substantially uniform strength.

A further object of my invention is the provision of methods and a machine for forming hollow plastic containers expeditiously from all temperatures except by heat of solidification.

A further object of my invention is the provision of methods of and a machine for using materials in the formation of hollow plastic containers.

A further object of my invention is the provision of a combination of forming and transferring mechanisms for a plurality of molds from a single plastic extruding machine in which the individual molds operate in succession to feed the flow of plastic from the extruding machine in substantially continuous.

A further object of my invention is the provision of a plurality of plastic forming mechanisms each connected to a single plastic extruding machine whereby plastic of different materials, or having different colors, may be supplied to the molds being in a single mold.

A further object of my invention is the provision of means for transferring a plastic tube to a hollow container immediately after the container

2

is formed and while the container is hot and preferably still in the mold whereby the container may be filled with sterile liquid immediately after the container is formed and may be sealed so that the container may not have a chance to be contaminated.

A further of my invention is the provision of a hollow plastic formed with a tapered and reversely curved bottom adapted for a stability form, for a part of the mold extending portion of the finished.

A further feature of my invention is the provision of a mold for controlling the operation of the plunger controlling at such instant the amount of plastic being delivered from the finished.

A further feature of my invention is the provision of a plunger and a mold for controlling the position of the plunger which itself controls the amount of plastic delivered by the machine to a mold.

Further objects and features of my invention will be apparent from the reading of the subjoined specification and claims and from a consideration of the accompanying drawings, by means, embodiments and modifications of my invention.

In the drawings:

Fig. 1 is a plan view partly diagrammatic showing a combination of a pair of plastic extrusion machines, a pair of plastic molders for forming hollow containers and conveyors for moving both of the extrusion machines and both of the plastic molders;

Fig. 2 is a view of the combination of Fig. 1 shown partially in section and partially in elevation;

Fig. 3 is a diagrammatic view in vertical section corresponding substantially to the central portion of Fig. 2 but showing a modified construction of my invention;

Fig. 4 is a diagrammatic view in vertical section corresponding substantially to Fig. 2 but showing portions of Fig. 2 and showing a further modified construction of my invention; and

Fig. 5 is a [illegible] of a plastic container which has been produced in a mold of one of the molders by forming hollow plastic article and which has been removed from said mold.

Referring now to the drawings, for a detailed description of the embodiments of my invention, as now best known, I have shown in the drawings [illegible] of plastic [illegible] Fig. 1 [illegible]

through passageways designated as 13, 14, 15, 16, 17, 18, to a pair of plastic dishheads 21 and 22. The passageways 13 and 14 lead from the extrusion machine 11 to the dishhead 22 and the passage of plastic through said passageways 13 and 14 is controlled by a valve 25. Passageways 15 and 16 lead from the extrusion machine 11 to the dishhead 21 and passage of plastic through said passageways 15 and 16 is controlled by a valve 24. Passageways 16 and 17 lead from extrusion machine 12 to dishhead 22 and the passage of plastic through said passageways 16 and 17 is controlled by a valve 23. Passageways 18 and 17 lead from extrusion machine 12 to dishhead 21 and the passage of plastic through said passageways 18 and 16 is controlled by a valve 26. The valves 23, 24, 25 and 26 are controlled by air pressure supplied through conduits 23a, 24a, 25a and 26a, respectively, and from a valve chest and timer 27a, said air pressure and conduits providing means for opening and closing said valves.

My novel dishhead 21 is designed to form plastic containers such as, for example, the container 30 and comprises essentially (a) a sleeve 31 into which plastic is extruded from conduits 16 and 17, and (b) a mandrel or hollow plunger 32 positioned in and cooperative with the sleeve to control the extrusion of plastic therefrom. Normally plastic is extruded from the dishhead 21 in the form of a tube having a varying thickness throughout its length and is controllable at any point as desired by the position of the mandrel 32 in order to control the wall thickness of the finished container and to insure uniformity that such wall thickness shall be substantially uniform. Associated with the sleeve 31 I provide a guide 33 (which might be formed if desired as a part of the sleeve 31) and which serves to position and guide the mandrel 32 so it is moved longitudinally within the sleeve 31. The guide 33 is provided with a spider vanes 34 in which there is positioned a spider 35 cooperating with a rod 36 formed in the mandrel 32 and maintaining the mandrel 32 against rotation. The mandrel 32 is formed with a central bore 37 through which air under pressure passes into the interior of the plastic container being formed after the mold has been closed over the tube. Air is supplied to the central bore 37 by means of flexible tubes 40 such tubes being connected to a valve chest and timer 27a. The supply of air 37 of course for the purpose of forming the tube or body be desired into a finished plastic container. The mandrel 32 may, if desired, be formed internally in any place or in any (as shown) be provided with a removable tip 39 secured by the collet nut thereof, and formed as shown with a taper which may be at any desired angle at the end. The sleeve 31 may also be formed internally with a tapered outlet portion for the purposes of adjustment and assembly I prefer to provide it with an outlet tip 38 which is formed of a plurality of pieces. The outlet opening 41 is that by 39 is tapered internally and their assembly with the exterior of the tip 38.

[illegible] first a solid slug, disk or rod of the length desired to form the bottom of the container. Then I immediately lower the plunger to form a tube with the end closed by the disk, the tube having the thickness of sidewalls desired at each point of its length as controlled by the mandrel. The tube is extruded just short of the bottom of the mold. The regular sequence of blowing follows as in the first method. The mold provides a backing for the shaping of the plastic container in the regular operation of the machines. Shown in dotted lines within the mold 41 is a plastic tube 44 as it would appear after it has been extruded and the mold closed but prior to the blowing and shaping of the tube into the desired shape of container 30. It will be noticed that beneath is the container 30 to be blown will have a larger circumference and more material adjacent the middle portion thereof, there is a larger portion and larger amount of material adjacent the central portion of the tube so that when the tube has been blown to the shape of the intended container 30, the walls of the container 30 will have a substantially uniform thickness without waste of material and without leaving any portions of the container 30 weaker than the rest. It is also to be understood that the contour of the tube which is deposited in the mold will depend therefore upon the shape of the final form of the container 30 to be formed. The shape of the mold itself will also conform to the shape of the intended container 30.

I also provide means for raising and lowering the mandrel 32 in accordance with the cross section of the tube at the various longitudinal portions thereof. It may be stated at this point that if it is desired to extrude a large amount of plastic, the mandrel 32 should be raised so that the annular opening between the tip 39 and the outlet 38 will be increased and so that a greater amount of plastic is extruded for dropping in the mold. On the other hand, if it is desired that the amount of plastic extruded shall be small, the mandrel 32 is lowered so that the annular opening between the tip 39 and the outlet 38 is constricted and a smaller amount of plastic is extruded. If, for example, first a small amount of plastic is desired, then a larger amount, and then a smaller amount during the extrusion period itself the mandrel 32 is first lowered to constrict the opening, it then raised to increase the size of the opening and is then lowered again to constrict the size of the opening. Thus a tube of any desired shape and size may be extruded. For example, a tube of the size and shape as shown at 42 in Fig. 2 may be provided by first lowering the mandrel 32 then raising the mandrel and then lowering it again. A tube of any desired contour may be thus extruded and tubes of extremely complicated cross section may be formed with substantially uniform sidewalls. In this connection I have formed a container of the complex shape shown at 43 of the being removed from the mold in the left hand side of Fig. 2. Such a complex container was formed on a machine similar to that illustrated and described herein.

The mechanism I have shown in Fig. 3 for raising and lowering the mandrel 32 consists of a rod 51 secured onto through 52 formed adjacent the upper end of the mandrel 32, the rod being provided with internal cam 53 which coacts with the balls 54 in rods 55. The mandrel 32 is formed with a head 56. A spring 58 is interposed between the head 56 and a cover plate 57 for the dishhead 21, the cover plate 57 being po-

5

attained, if desired, upon a plurality of stops 86 used upon the top of guide 82. The rack engages through openings formed in the rings 89 and the movement of the rack 84 is controlled by any suitable pneumatic, hydraulic or electrical mechanism, synchronized with the operation of the valve 39 and with the opening and closing of the mold 41 so that the movement of the tube 46 is accurately predetermined and timed.

The mold 41 is provided with a recess 91, into which I place a plastic film 92 which has previously been prepared with a reversely printed legend. The plastic container is pressed against the film by air pressure and is thus fused to the film. The printing on the film 92 is on the side toward the inside of the mold and thus the printing is sealed between the film and the main wall of the container and can be read through the transparent film. If desired, the recess 91 may be omitted so that the outside wall of the container will be perfectly smooth.

In Fig. 3 I have shown a modified embodiment of my invention. Therein similar parts are designated by the same numerals with the addition of 100 and there is shown a cylinder 181, a mandrel 182, a guide 183, a spring 184, a tapered tip 185, and a tapered outlet opening 186. Associated with the tube is a nut 191, a rack 194, and a spring 196. Within the bore 187 I extend a tube 191 by which liquid may be supplied to the container after the container is formed after the air pressure released. The tube 191 is spaced from the sidewalls of the bore 187 so that air supplied to the bore 187 by the conduit 189 under pressure is available to shape the tube into the desired form of container.

In Fig. 4 I have shown another embodiment of my invention wherein similar parts are designated by the same numerals as in Fig. 2, with the addition of 200. Therein there is provided a cylinder 291, a mandrel 292, and a guide 293. The mandrel 292 is provided with a head 295 and a spring 296 is interposed between the head 295 and the cover 297. The mandrel 292 is formed with a bore 287 to which air is admitted by the conduit 289. The movement of the mandrel is controlled by a cam 298. This cam may be shaped as desired to control the movement of the mandrel 292 so that the tube which is extruded shall have the desired contour and the desired amount of plastic may be extruded at various portions of the length of the tube extrusion. It is to be noted that cams of different shape may be substituted in place of the cam 292 to refer to secure different contours of tubes and diverging shapes of the finished form of the container.

It will be understood that the mandrel 92 is prevented from movement except by the actuation of either the aforementioned rack 84 and nut 81, or by the cam 298. In other words, the mandrel 92 can only be moved either by the rack 84 and nut 81 or under the control of cam 298.

All of the operation of the machine may be controlled by any standard method of controlling operations in sequence. Referring especially to the structure shown in Figs. 1 and 2, the cycle of operation is as follows: The valves 38 and 39 open, plastic is extruded into the distended 41 and tension rod 46 is proceeded at a rate of the desired stamp between the reverse contour 90 and the mandrel 92. The mandrel 92 during the extrusion is moved up and/or down to control the shape of the extruded tube. This movement is controlled by the rack 84 and the nut 81 driven gear 81. A strip of plastic film 92 is placed in

6

the recess 91. During this time the valves 38 and 39 have remained closed. Now the valves 37 and 38 are closed and the valves 36 and 38 are opened. As above the press does or immediately operates the mold 41 does forming a bushing for the blowing of the container. While plastic is being extruded from the distended 41, air under pressure flows through the bore 87 surrounding the tube 46 to force the container 50 and welding the plastic film 92 thereto. Next the air pressure is released. Thereafter the mold is opened and the container 50 is pulled from the opening 99. In the meantime, plastic has been flowing through head 81 to form a plastic tube for the subsequent formation of another container such as 50. The mold 50 has remained open. Now the valves 36 and 38 are closed and the valves 37 and 39 again are opened, thereby a tube of plastic is extruded through mold head 81, while the tube of plastic just extruded from the head 81 is on hand in mold 50 as it closes and is blown to shape. Then the mold 50 is opened, the new container 50a is released from the mold. Again valves 36 and 38 are closed and valves 37 and 39 again opened. So plastic continuously flows from extrusion machine 11 and 12 and containers are continuously formed by the dieheads 81 and 82. By the use of the two machines different colored plastic may be supplied to form articles of variegated colors. Since these two extrusion machines could be used if desired, or if desired, one of the machines 11 or 12 could be dispensed with. Even if there are the two machines 11 and 12, one, as for example 12, could be made inoperative by closing the valves 38 and 39 during a whole operation. When the valves 36 and 38 are maintained closed during a whole operation the machine is effectively one in which there is effectively a single plastic extrusion machine supplying plastic to a plurality of dieheads.

While a single diehead may be used to receive plastic from a plurality of extrusion machines to produce containers having multicolors, yet I prefer to have at least two dieheads in order to secure continuous operation of the extrusion machine or machines. I may, however, provide more than two and often will use three, four, six or even more in a single operation.

In forming a container of different colors or types of different plastics, I may end often will form the lower part of one type and the upper part of a different type. In order to do so the machine 11 may supply plastic while said part of the container is being formed and then will be closed off and the machine 12 will supply plastic while the rest is being extruded.

The operation of the embodiment shown in Fig. 4 is exactly the same as the operation of the embodiment shown in Fig. 2. The operation of the embodiment shown in Fig. 3 is the same except that after the air is supplied to shape the container and after the air is released through the mold is opened, liquid is supplied through the tube 191. Then after the mold is opened, a solid piece of plastic is supplied to seal the open upper end of the container. Alternatively, the upper end of the container may be sealed by heating, pressing, and so forth.

It is to be understood that the above described embodiments of my invention are illustrative only and that modifications may occur to those skilled in the art without departing from the spirit and scope of my invention.

I claim:

1. A machine for forming shaped articles of

[fol. 52]

7

plastic material comprising a die head having walls and a central space within said walls having an outlet portion formed with a bevelled element, a longitudinally bored mandrel in the central space of said die head formed with a tapered end, power mechanism for moving said mandrel, in either direction lengthwise of said die head to constrict or enlarge the annular opening surrounding said mandrel in accordance with any predetermined pattern and for preventing movement of the mandrel other than by the said mechanism; means for supplying air under pressure to the bore of said mandrel; and means for supplying plastic under super atmospheric pressure to the space between the walls of said die head and said mandrel concurrently with, and at a time in the cycle of operations of the machine coordinated with, a movement of the mandrel lengthwise of said die head.

2. A machine for forming shaped articles of plastic material comprising a die head having walls and a central space within said walls having an outlet portion formed with a tapered element, a bevel terminal in the central space of said die head formed with a tapered and portion normally positioned in said tapered element, mechanism for moving said mandrel in either direction lengthwise of said die head to constrict or enlarge the annular opening surrounding said mandrel within the tapered portion of said die head in accordance with any predetermined pattern and for preventing movement of the mandrel other than by the said mechanism; means for supplying air under pressure to the bore of said mandrel; means for supplying plastic under super atmospheric pressure to the space between the walls of said die head and said mandrel concurrently with, and at a time in the cycle of operations of the machine coordinated with, a movement of the mandrel lengthwise of said die head.

3. A machine for forming shaped articles of plastic material comprising a die head having walls and a central space within said walls having an outlet portion formed with a tapered element, a bevel terminal in the central space of said die head formed with a tapered end portion normally positioned in said tapered element, mechanism for moving said mandrel in either direction lengthwise of said die head to constrict or enlarge the annular opening surrounding said mandrel within the tapered portion of said die head in accordance with any predetermined pattern and for preventing movement of the mandrel other than by the said mechanism; means for supplying air under pressure to the bore of said mandrel; means for supplying plastic under super atmospheric pressure to the space between the walls of said die head and said mandrel concurrently with, and at a time in the cycle of operations of the machine coordinated with, a movement of the mandrel lengthwise of said die head, a mold positioned adjacent to the outlet portion of the die head and means for closing and opening said mold concurrently with the supplying of plastic to said die head.

4. A machine for forming shaped articles of plastic material comprising a die head having walls and a central space within said walls having an outlet portion formed with a tapered element, a bevel terminal in the central space of said die head formed with a tapered end portion normally positioned in said tapered element, mechanism for moving said mandrel in either direction lengthwise of said die head to constrict or enlarge the annular opening surrounding said mandrel within the tapered portion of said die head in accordance with any predetermined pattern and for preventing movement of the mandrel other than by the said mechanism; means for supplying air under pressure to the bore of said mandrel; means for supplying plastic under super atmospheric pressure to the space between the walls of said die head and said mandrel concurrently with, and at a time in the cycle of operations of the machine coordinated with, a movement of the mandrel lengthwise of said die head, a mold positioned adjacent to the outlet portion of the die head and means for closing and opening said mold concurrently with the supplying of plastic to said die head, and means for cooling said mold.

8

tapered element, mechanism comprising a rod threaded on said mandrel, a shaft engaged with said rod and mechanism for automatically rotating the rod and moving said mandrel in either direction lengthwise of said die head to constrict or enlarge the annular opening surrounding said mandrel within the tapered portion of said die head in accordance with any predetermined pattern and for preventing movement of the mandrel other than by the said rod and rod; means for supplying air under pressure to the bore of said mandrel; and means for supplying plastic to the space between the walls of said die head and said walls concurrently with and in a phase of the cycle of operations of the machine coordinated with the time that said mandrel is being moved lengthwise of said die head.

5. A machine for forming shaped articles of plastic material comprising in combination a plurality of die heads each having an outlet portion, a mandrel in each of said die heads, mechanism for moving said mandrels lengthwise of said die heads to constrict or enlarge the annular openings surrounding said mandrels in accordance with any predetermined pattern, and means for supplying plastic to said die heads at the same time that said mandrels are being moved lengthwise of said die heads comprising a single plastic extrusion machine having a plurality of outlets each controlled by a valve and each connected with one of said die heads, and means for closing each of said valves in a sequence while at least one other of the valves is open so that the extrusion machine continuously supplies plastic to said die heads in a predetermined sequence of operations.

6. A machine for forming shaped articles of plastic material comprising in combination a plurality of die heads each having an outlet portion, a mandrel in each of said die heads, mechanisms for moving said mandrels lengthwise of said die heads to constrict or enlarge the annular openings surrounding said mandrels in accordance with any predetermined pattern, and means for supplying plastic to said die heads at the same time that said mandrels are being moved lengthwise of said die heads comprising a single plastic extrusion machine having a plurality of valves each controlling the supply of plastic to one of said die heads and means for opening one of said valves whenever the other valves are closed so that said extrusion machine may supply plastic continuously to at least one of said die heads.

7. A machine for forming shaped articles of plastic material comprising in combination a plurality of die heads each having an outlet portion, a mandrel in each of said die heads, mechanism for moving said mandrels lengthwise of said die heads to constrict or enlarge the annular openings surrounding said mandrels in accordance with any predetermined pattern, and means for supplying plastic to said die heads at the same time that said mandrels are being moved lengthwise of said die heads comprising a single plastic extrusion machine having a plurality of outlets each controlled by a valve and each connected with one of said die heads, and means for opening each of said valves in a sequence while at least one other of the valves is closed so that the extrusion machine continuously supplies plastic to said die heads in a predetermined sequence of operations.

8. A machine of molding plastic articles which comprises providing an enclosed zone of plastic

plasting a unitized transparent plastic film in an open mold; closing said mold over said undesigned mass of plastic so that the marked side of said film is forward the undesigned mass of plastic; and causing the article in said mold so that the film is welded to the article with the marking inside of said plastic film.

8. A machine for forming closed articles of plastic material comprising in combination a plurality of die heads each having an outlet portion, a mandrel for the outlet portion of each die head to constrict the outlet in accordance with a predetermined pattern, means for supplying plastic to the die heads comprising a plastic extrusion machine, separate ducts connecting the plastic extrusion machine with the respective die heads, a valve in each duct controlling the supply of plastic to the connected die head, and means for opening one of said valves whenever the other valve is closed so that said extruded machine supplies plastic continuously to first one of said die heads and then to the other die head.

10. In an apparatus for forming hollow shaped articles of plastic material comprising in combination, a plurality of die heads each having an outlet portion, a mandrel in each of said die heads cooperating with the said outlet portion thereof and forming therewith an opening surrounding each mandrel in accordance with any predetermined pattern, means for supplying plastic material to said die heads comprising a plastic extrusion machine having a plurality of outlet ducts connected with the die heads, valve means connected with the ducts for controlling the supply of plastic material from the ducts to said die heads, and means for opening said valve means for one duct while closing the valve means for the other duct and causing the said extrusion machine to supply the plastic material continuously by the valve means and alternately through the ducts to said die heads.

11. In an apparatus for forming hollow shaped articles of plastic materials of different characteristics and comprising in combination, a plurality of die heads each having an outlet portion, a mandrel in each of said die heads cooperating with the said outlet portions thereof and forming therewith a discharge opening surrounding each mandrel in accordance with any predetermined pattern, means for supplying plastic to said die heads comprising a separate plastic extrusion machine for each plastic material, each extrusion machine having a plurality of outlet ducts connected with the die heads, valve means connected with the ducts for controlling the supply of plastic materials from the ducts to said die heads, and means for opening said valve means for one duct, while closing the valve means for the other duct of each extrusion machine, and the said extrusion machines each supplying the plastic materials continuously to said respective

valve means and through ducts from each extrusion machine to said die heads.

12. In a method of forming hollow shaped articles of plastic material, the steps of forming plastic material into tubes of predetermined pattern in a plurality of tube forming zones, supplying the plastic material under pressure in continuous flow, directing the flow of plastic material through separate paths to the tube forming zones, controlling the supply of plastic material to the tube-forming zones, and alternately interrupting flow in one path while establishing flow through the other path at the place of control to effect delivery of said continuous flow of plastic material alternately to the tube forming zones.

13. In a method of forming hollow shaped articles of plastic materials of different characteristics comprising forming the plastic materials into tubes of any predetermined pattern in a plurality of tube-forming zones, supplying the plastic materials separately under pressure and in continuous flows, directing the flows of plastic materials from both supplies through separate paths to each of the tube-forming zones, and controlling the supply of the materials from the respective supply sources to the tube forming zones by alternately interrupting flow of the respective plastic materials in one path from each supply while establishing flow through the other path to effect delivery of said continuous flows of plastic materials first to one tube-forming zone and then to the other tube-forming zone.

14. The process of forming a plastic article of plastic materials having different characteristics including supplying the plastic materials of different characteristics from a plurality of plastic extrusion machines each connected to a single mold whereby plastic of different characteristics is supplied at the same time to said single mold.

JOHN B. HAINES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
709,859	Fuhs	May 27, 1902
1,419,899	Williams	June 6, 1922
1,836,328	Schmidt	May 10, 1927
1,637,397	Whitehouse	July 31, 1927
1,648,649	Dalgosh	Mar. 8, 1928
1,831,256	Bowker	Nov. 10, 1931
2,044,021	Wiener	June 16, 1936
2,063,831	Dinsmore	May 31, 1941
2,240,139	Pierce	Sept. 14, 1948
2,427,327	Kopitke	Dec. 25, 1945
2,447,197	Bailey	Apr. 13, 1948

FOREIGN PATENTS

Number	Country	Date
611,457	France	Mar. 1, 1949

[fol. 55]

Feb. 12, 1957 O. B. SHERMAN 2,780,835

APPARATUS FOR EXTRUDING PLASTIC TUBES

Filed March 2, 1954 2 Sheets-Sheet 1

Fig. 1.

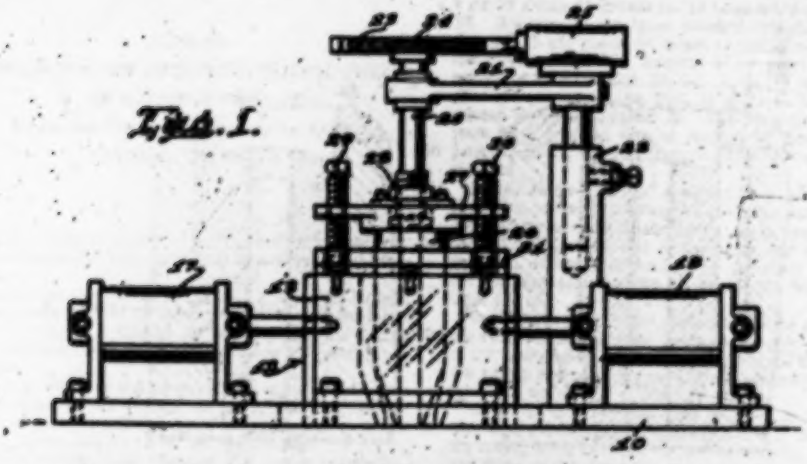


Fig. 3.

Fig. 2.

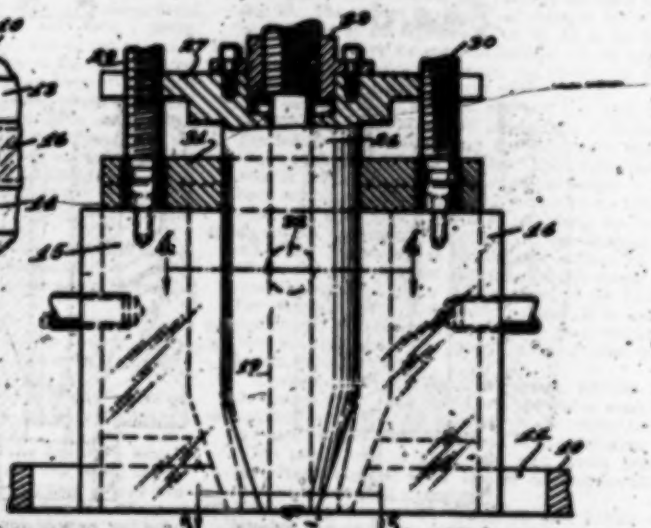


Fig. 4.

Fig. 5.

INVENTOR.
ORVILLE B. SHERMAN
BY W. A. Schaich
L. C. Fanciani
ATTORNEYS.

[fol. 57]

Feb. 12, 1957 O. B. SHERMAN 2,780,835

APPARATUS FOR EXTRUDING PLASTIC TUBES

Filed March 2, 1954 2 Sheets-Sheet 2

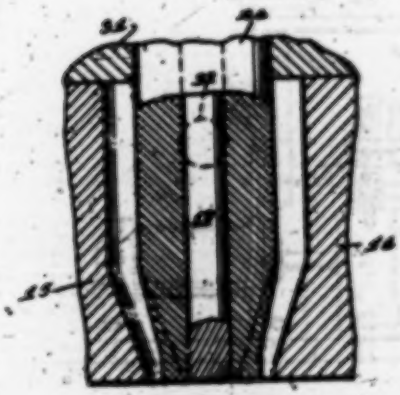


Fig. 6.

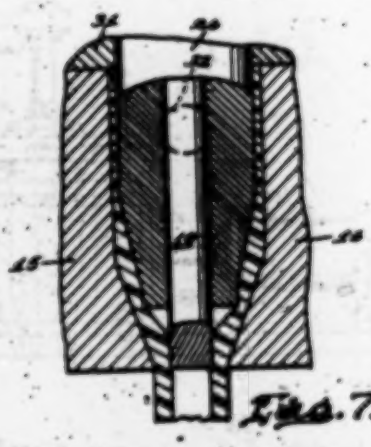


Fig. 7.

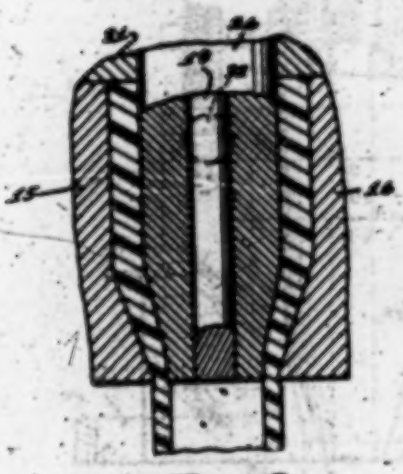


Fig. 8.

Fig. 9.

INVENTOR.
ORVILLE B. SHERMAN
BY W. A. Schaich
A. C. Fennimore
ATTORNEYS

United States Patent Office

2,788,835
Patented Feb. 12, 1957

1

2,788,835

APPARATUS FOR EXTRUDING PLASTIC TUBES

Orville R. Sherman, Toledo, Ohio

Application March 3, 1954, Serial No. 413,625
5 Claims. (Cl. 18—14)

This invention relates to plastics and particularly to an apparatus for forming tubing of organic plastic material.

According to well-known practice a tubing of organic plastic material may be formed by plasticizing the material and forcing it through an orifice having the desired configuration. This method is commonly known as extrusion.

It is an object of this invention to provide an apparatus for forming tubing wherein the inside and outer dimensions of the tubing, the shape of the tubing, the thickness of the tubing may be varied during extrusion.

Other objects of the invention will appear hereinafter.

Basically the apparatus comprises a multi-sectional body wherein the surfaces of the body form a cavity. A mandrel projects into the cavity and an outer mandrel is positioned in sliding relationship to the inner mandrel whereby a tubular cavity is formed between the outer mandrel and the sections of the body. Means is provided for moving the outer sleeve longitudinally and for moving the sections of the body toward and away from the outer mandrel to vary the shape and size of the orifice during the extrusion of the plastic material.

Referring to the accompanying drawings:

Fig. 1 is an elevational view of an apparatus embodying the invention;

Fig. 2 is a fragmentary part-sectional view of a portion of the apparatus, parts being broken away;

Fig. 3 is a plan view of the apparatus looking into the orifice;

Fig. 4 is a sectional view at the line 4—4 on Fig. 2;

Fig. 5 is a sectional view at the line 5—5 on Fig. 2;

Fig. 6 is a fragmentary sectional elevational view of a portion of the apparatus shown in Fig. 2;

Figs. 7, 8 and 9 are similar to Fig. 6 showing the extrusion of plastic material with the parts in different positions.

Referring to Fig. 1, the apparatus includes a base 10 having an opening 11 therethrough, over which is positioned an extrusion body 12. The extrusion body 12 comprises a multiplicity of sections including two stationary upright members 13, 14 parallel, spaced apart, and bolted to the base 10. Two diametrically opposed sections 15, 16 are positioned between the stationary members 13, 14 and are movable toward and away from each other by air cylinders 17, 18, respectively, mounted on the base 10.

A mandrel 19 projects downwardly between the movable sections 15, 16 and is maintained in position by a mandrel extension 20 connected for rotation in a bracket 21. The bracket 21 is vertically adjustable in support 22. The mandrel 19 may be rotated through a rack 23 and pinion 24 mounted on the mandrel extension 20. The rack may be reciprocated by a small air cylinder 25.

As shown in Fig. 2, wherein the plate 14 is removed, an outer mandrel 26 surrounds the inner mandrel 19 in flush and sliding relationship therein. Means is provided for moving the outer mandrel longitudinally with respect to the inner mandrel and includes a flange 27 formed on the upper part of the outer mandrel 26 to which is bolted a rod 28 riding on threads on the inner mandrel extension 20. Rotation of the inner mandrel extension through the rack 23 and pinion 24 causes a vertical movement of the outer mandrel 26. Rotation of the outer mandrel is prevented by guide bolts 29, 30. A cap 31 is positioned over the sections of the body in order to form a rail around the outer mandrel 26. The movable stationary plate 14 is provided with an opening 32 through which plastic material from an extruder (not shown) may be supplied.

By the above described construction, a tubular cavity is formed between the outer mandrel and the inner surfaces of the sections of the body. More specifically as shown in Figs. 3, 4 and 5, the shape and size of the extrusion orifice is determined by the outer sleeve 26, the two stationary sections 13, 14 and the movable sections 15, 16.

The various parts of the apparatus may be moved during extrusion to adjust the inside and outside dimensions of the tubing, the size of the tubing, and the thickness of the tubing during extrusion without any interruption of the extrusion.

As shown in Fig. 7, the outer mandrel 26 may be retracted upwardly within the body in such a manner that the tubing being extruded has the same inside dimensions and shape as the dimensions and shape of the inner mandrel 19. The outside dimensions and shape of the tubing is controlled by the sections 13, 14, 15, 16 of the body 12. Movement of the movable sections 15, 16 toward and away from the inner mandrel will change the outer dimensions, shape and thickness of the tubing.

As shown in Fig. 8 the outer sleeve 26 is in flush relationship with the inner mandrel and sections of the body. The tubing being extruded has the same inside dimensions and shape as the outer mandrel. The outside dimensions of the tubing are determined by the sections of the body as is the outside shape and thickness of the tubing. Movement of the outer mandrel 26 will change the inside dimensions and shape and in addition the thickness of the tubing. Movement of the movable sections 15, 16 toward and away from the outer mandrel will change the outside dimensions, shape and thickness of the tubing. For example, in Fig. 9, the outer mandrel 26 is moved downwardly and the movable sections 15, 16 moved away from the outer mandrel to form a tubing of larger cross section and thicker walls.

It may thus be seen that the apparatus provides for the change of the inner dimensions and shape, outer dimensions and shape, and thickness of the tubing during extrusion, without any interruption of the extrusion.

The term plastic or plastics, as used herein, defines any organic material which has the required condition of plasticity to permit extrusion.

The terms tubular and tubing, as used herein, are intended to include any hollow shapes in which plastic materials may be formed including non-circular and irregular shapes.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. An apparatus for forming organic plastic material in tubular form which comprises a multi-sectional body forming an open-ended cavity, an inner mandrel positioned within said cavity, an outer mandrel surrounding the inner mandrel and in sliding relationship therein, means for supplying plastic material to the tubular cavity formed between the outer mandrel and the body and thereby causing plastic material to flow out of the open end of the cavity in tubular form, means for moving the outer mandrel longitudinally relative to the inner mandrel during the supplying of the plastic material, and means for

52

[fol. 60]

moving said sections of the body substantially normal and away from the outer mandrel during the supplying of the plastic material to change the space between the body and the outer mandrel.

2. An apparatus for forming organic plastic material in tubular form which comprises a body having an open ended cavity therein, an inner mandrel positioned within said cavity, an outer mandrel surrounding the inner mandrel and in sliding relationship therein, means for supplying plastic material to the tubular cavity formed between the outer mandrel, said, the body and thereby causing plastic material to flow out of the open end of the cavity in tubular form, and means for moving the outer mandrel longitudinally relative to the inner mandrel during the supplying of the plastic material.

3. An apparatus for forming organic plastic material in tubular form which comprises a multi-sectional body having an open ended cavity, the surface of said sections forming the cavity being convergent toward the open end of the cavity, an inner mandrel positioned within said cavity, an outer mandrel surrounding the inner mandrel and in sliding relationship therein, the configuration of said outer mandrel varying longitudinally along the length of the mandrel, means for supplying plastic material to the tubular cavity formed between the outer mandrel and the body and thereby causing plastic material to flow out of the open end of the cavity in tubular form, means for moving the outer mandrel longitudinally relative to the inner mandrel during the supplying of the plastic material to thereby vary the internal size and shape of the cavity being extruded, and means for moving said sections of the body individually toward and away from the outer mandrel during the supplying of the plastic material to change the outer dimensions and shape of the tubing being extruded.

the supplying of the plastic material to change the space between the body and the outer mandrel.

4. An apparatus for forming organic plastic material in tubular form which comprises a body having an open ended cavity therein, an inner mandrel positioned within said cavity, an outer mandrel surrounding the inner mandrel and in sliding relationship therein, means for supplying plastic material to the tubular cavity formed between the outer mandrel, said, the body and thereby causing plastic material to flow out of the open end of the cavity in tubular form, and means for moving the outer mandrel longitudinally relative to the inner mandrel during the supplying of the plastic material.

5. An apparatus for forming organic plastic material in tubular form which comprises a multi-sectional body having an open ended cavity, the surface of said sections forming the cavity being convergent toward the open end of the cavity, an inner mandrel positioned within said cavity, an outer mandrel surrounding the inner mandrel and in sliding relationship therein, the configuration of said outer mandrel varying longitudinally along the length of the mandrel, means for supplying plastic material to the tubular cavity formed between the outer mandrel and the body and thereby causing plastic material to flow out of the open end of the cavity in tubular form, means for moving the outer mandrel longitudinally relative to the inner mandrel during the supplying of the plastic material to thereby vary the internal size and shape of the cavity being extruded, and means for moving said sections of the body individually toward and away from the outer mandrel during the supplying of the plastic material to change the outer dimensions and shape of the tubing being extruded.

References Cited in the file of this patent

UNITED STATES PATENTS

1,378,725	Gueinzius	Aug. 24, 1920
1,874,329	Maynard	Aug. 6, 1932
2,511,193	Pendergast	June 27, 1950
2,551,699	Welch	May 22, 1951

[fol. 61]

Feb. 6, 1962 K. HEGGO 3,018,461

Filed July 16, 1958

FIG 1

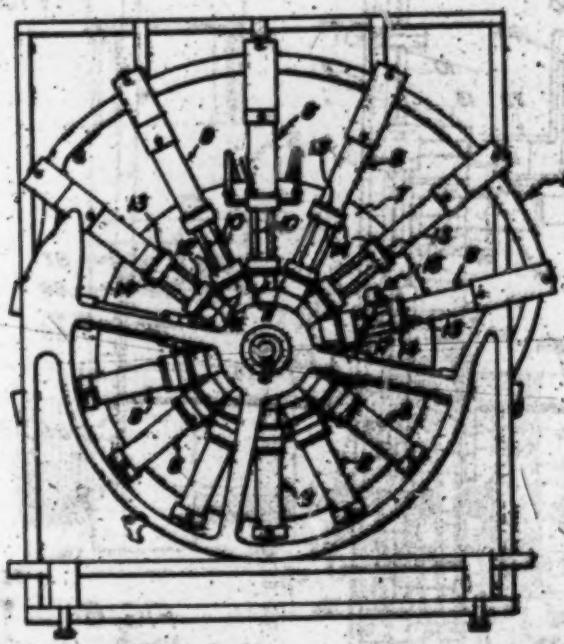
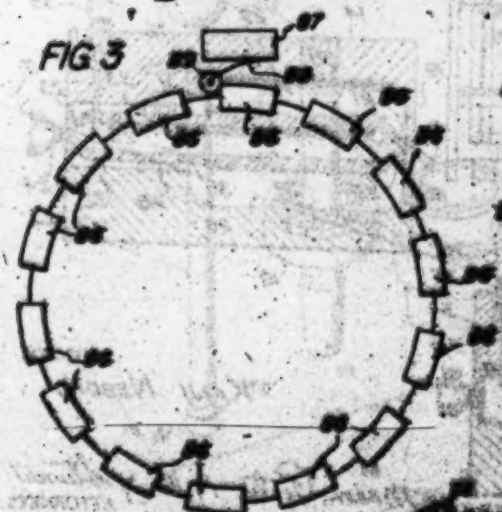


FIG 3



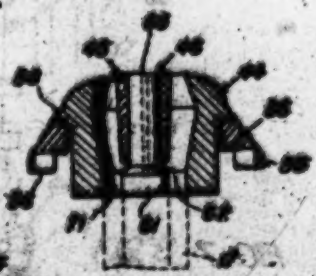


FIG 5

54

[fol. 63]

Feb. 6, 1962 K. NEGORO 3,019,481

VARIABLE ORIFICE EXTRUSION DIE

Filed July 13, 1959 3 Sheets-Sheet 2

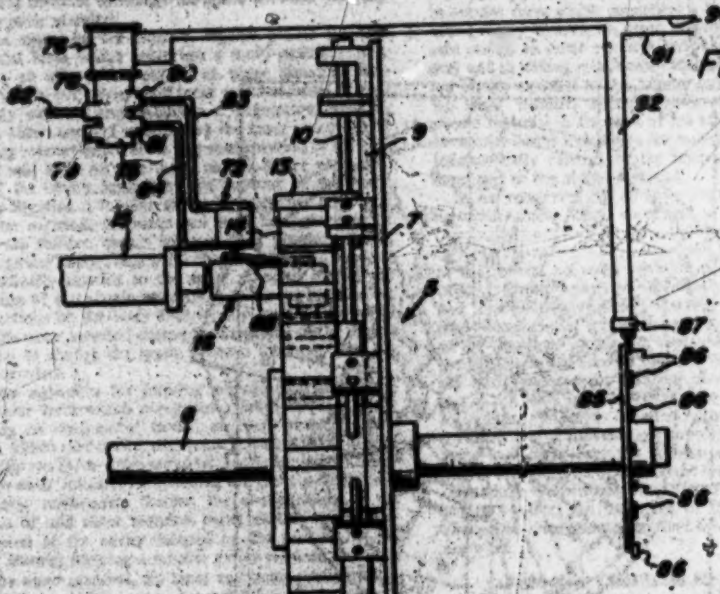


FIG 2

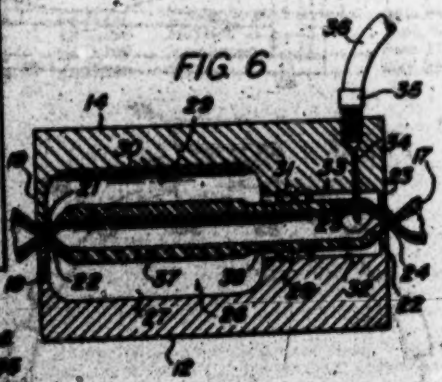


FIG 6

FIG 7

INVENTOR
KAIJI NEGORO

BY Mason, Fenwick, Lawrence & Stewart
ATTORNEYS

Feb. 6, 1962 K. NEGORO 3,019,481

VARIABLE SKIVING EXTRUSION DIE

Filed July 16, 1959 3 Sheets-Sheet 3

FIG 4

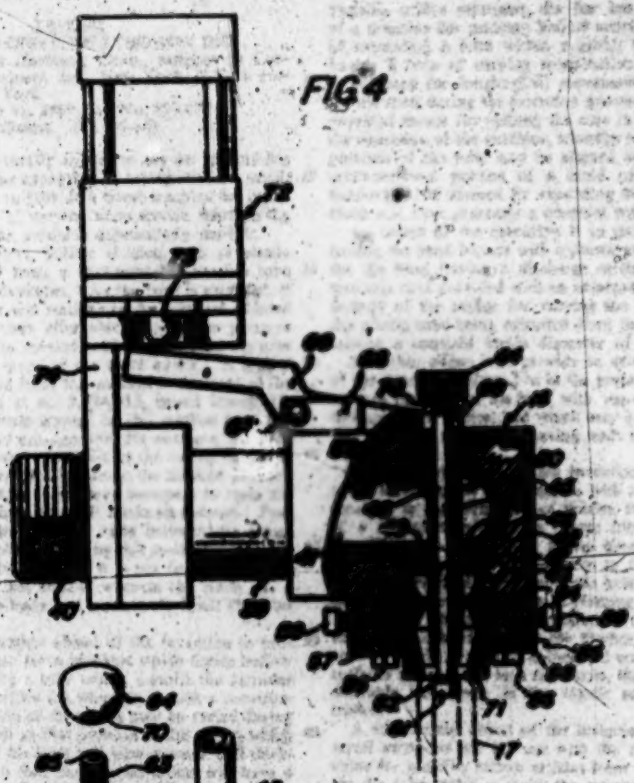
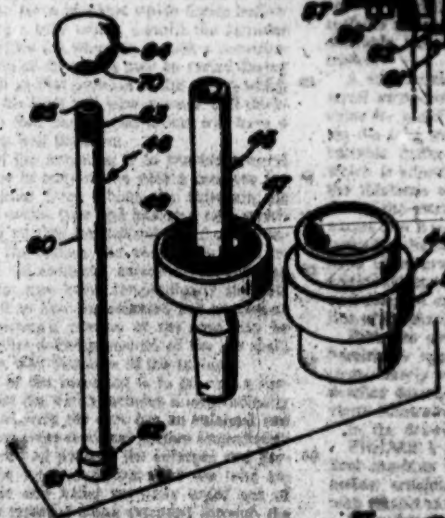
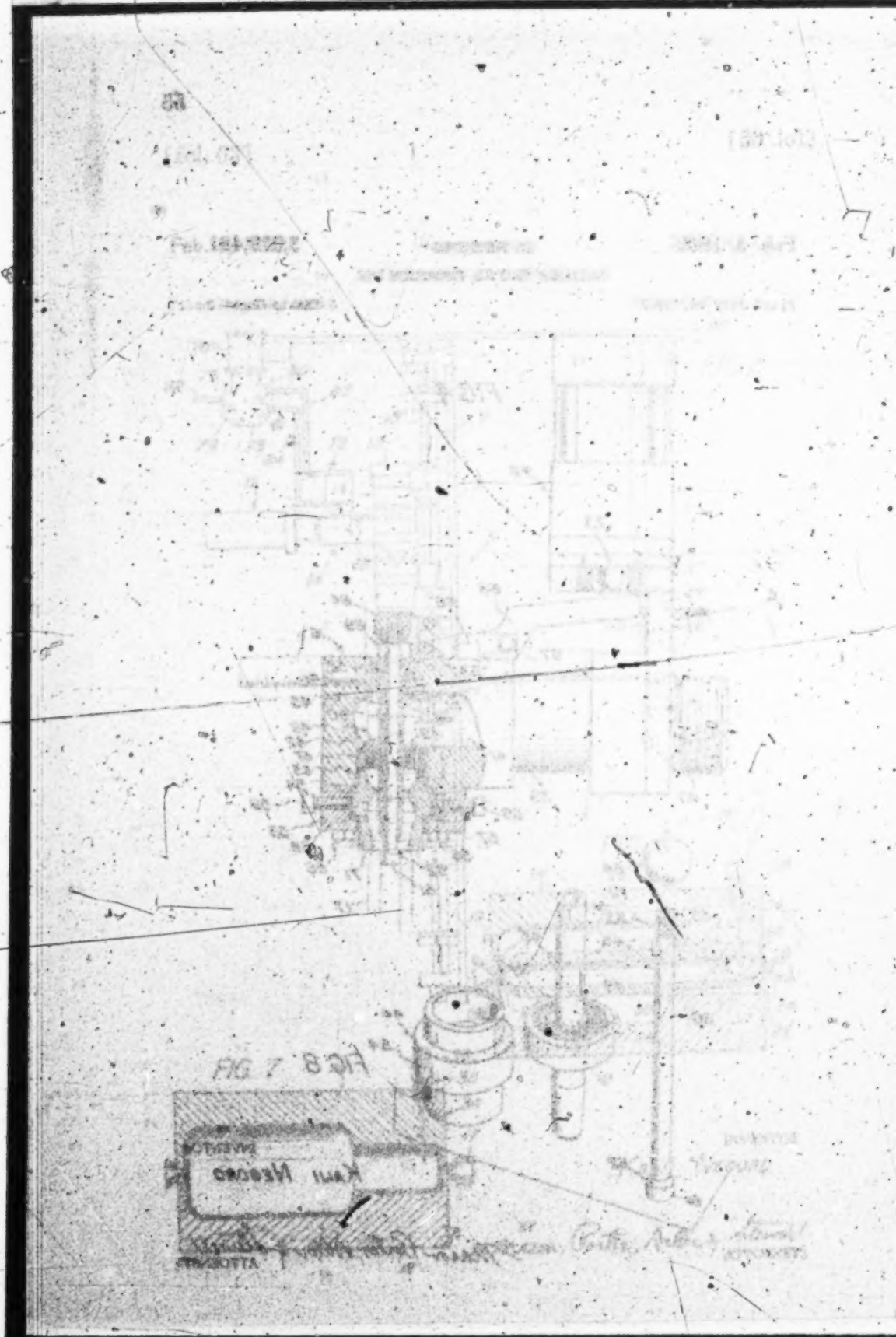


FIG 8



INVENTOR
KAZU NEGORO

BY Mason, Porter, Miller & Stewart
ATTORNEYS



[fol. 67]

United States Patent Office

3,019,481
Patented Feb. 6, 1962

3,019,481

VARIABLE ORIFICE EXTRUSION DIE

Kurt Nagora, West Hartford, Conn., assignor to Continental Can Company, Inc., New York, N.Y., a corporation of New York

Filed July 16, 1959, Ser. No. 827,470
8 Claims. (Cl. 18—5)

The invention generally relates to the art of forming hollow articles by the expansion of tubing within a mold, and primarily seeks to provide a novel machine for forming hollow articles of varying cross-section wherein the wall thickness of the article is substantially uniform.

At the present time, hollow articles, such as plastic bottles, are formed from a continuously extruded tube of a constant wall thickness. As the tube is extruded, it is gripped by molds and sections of the tube are isolated and sealed at their ends, after which, fluid under pressure is introduced into the isolated sections to expand the tube to conform to the shape of the mold cavity. A typical machine for carrying forth this method is disclosed in the patent to Rexhberg et al., 2,794,452, issued March 12, 1957. Since the article formed by this method normally has areas of reduced cross-section, for example, the neck of a bottle, the uneven expansion of the tubing results in undesired varying wall thicknesses in the finished product. In the case of a bottle, it has been necessary to ream the neck portion to reduce the wall thickness thereof. Further, at the present time, the ratio between the cross-section of the articles formed by this method is considerably restricted. For example, it is not feasible to form a plastic bottle by this method wherein the bottle has a very large diameter body and a relatively small diameter neck.

It is therefore another object of the invention to provide a novel extruder for a machine which forms hollow articles by expanding a tube within a mold, the extruder having a variable orifice die which is of such a construction that the thickness of the tubing may be varied during the extrusion process so that portions of the tubing which are to be expanded the least will have a lesser wall thickness, with the result that the finished article will have a substantially uniform wall thickness.

Another object of the invention is to provide a novel extrusion die for use in conjunction with a machine for forming hollow articles from tubing, the extrusion die being of a variable orifice type and having a core which includes a large end portion for determining the final internal diameter of the tubing, the core being of a reduced cross-section immediately adjacent the enlarged end portion, and the core being longitudinally shiftable through the die shell so that the enlarged end portion or the reduced cross-sectional portion of the core may be aligned with the extrusion opening of the die shell, and thus control the wall thickness of the tubing.

A further object of the invention is to provide a variable orifice extrusion die which includes a longitudinally shiftable core, and wherein the core has an enlarged end portion and a reduced cross-sectional portion immediately adjacent the enlarged end portion, the enlarged end portion determining the internal diameter of the tube extruded from the die and being movable into and out of the die shell by the manual force exerted through the die, whereby the reduced cross-sectional portion of the core is aligned with the orifice defining portion of the die shell, and thus varies the wall thickness of the tubing passing through the die during the extrusion process so that the enlarged end portion of the core may be moved into alignment with the orifice defining portion of the die shell to reduce the wall thickness of the tubing passing through the die during the extrusion process.

A further object of the invention is to provide a variable orifice extrusion die for use in an extruder of a machine for molding hollow articles by the process of expanding a tube within a mold, the extrusion die having a core of varying cross-section and which core is mounted for longitudinal movement with respect to the die shell during the extrusion process, and there being provided means for shifting the core in timed relation to the operation of the machine, whereby portions of the core and portions of the tube may be aligned with the maximum cross-sectional portion of a mold cavity so that the finished article formed by expanding the tube within the mold will have generally a constant wall thickness.

An object of the invention is to provide a novel extrusion die head for use with a plastic extruding machine, the die head having a discharge orifice and an orifice core provided with an enlarged end portion, the relative velocity of the orifice for varying the wall thickness of the plastic tube being extruded from the orifice or maintaining a constant inside diameter of the plastic tube.

A further object is to provide an orifice core of the character referred to in the preceding object which extends through the die head with one end projecting exteriorly of the orifice, and which may be readily removed and replaced with cores having ends of different cross-sections.

Still another object of the invention is to provide a novel extrusion die head for use with a plastic extruding machine in the formation of bottles, the die head being of a construction that the plastic tube being extruded therefrom has a constant wall thickness, which dimension substantially corresponds to the finished inside dimension of the neck of the bottle being formed, thereby eliminating the necessity for a reaming operation.

A further object of the invention is to provide a novel extrusion die head wherein the discharge orifice and the core of the die head have cylindrical surfaces and exposed surfaces are reduced to a minimum, thus eliminating undesirable turbulence in the plastic material being extruded.

A still further object of the invention is to provide a novel extrusion die for use with the extruder of a machine for molding hollow articles from a tube by expanding the tube within a mold, the extrusion die being of a variable orifice type and being provided with a core which is adjustable during the extrusion process so that the thickness of the wall of the tubing may be varied during the extrusion process, the adjusting of the core being of a nature that it may be used as a timing mechanism by merely replacing the head of the existing extruder with a special head incorporating the extrusion die and by providing additional cams on the cam plate of the machine for operating the extrusion die to effect variations in the wall thickness of the tubing.

With the above, and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a vertical sectional view of a variable orifice extrusion die for use in the formation of hollow articles, with parts of the machine shown in connection with the die;

FIGURE 2 is an enlarged vertical sectional view of the extrusion die of FIGURE 1, the core being shown in a different position than that shown in FIGURE 1, and the means for operating the variable orifice extrusion die is shown mounted on the periphery of a cam plate;

FIGURE 3 is a vertical view of the cam plate and

under head, with portions of the extruder head being broken away and shown in section in order to clearly illustrate the details of the extrusion die mounted thereon.

FIGURE 3 is an enlarged fragmentary sectional view taken through the extrusion die and shows the core adjusted with respect to the die shell to form tubing of a minimum wall thickness.

FIGURE 4 is an enlarged fragmentary sectional view and shows the initial relationship of a mold with respect to a section of the extruded plastic tube from the extruder.

FIGURE 5 is an enlarged fragmentary sectional view similar to FIGURE 4, and shows the section of the plastic tube after it has been expanded laterally to conform to the configuration of the cavity of the mold.

FIGURE 6 is an enlarged exploded perspective view of the extrusion die.

In the exemplary embodiment of the invention illustrated herein, the variable orifice extrusion die is used in connection with the extruder of a machine for forming hollow articles from tubing of tubes. A typical example of such machinery is disclosed in the above-mentioned Hendricks et al. patent. In such a machine, a plastic tubing of parison is extruded by a conventional shell and mandrel type extrusion die and is received in a mold which is halved to receive the tube. The tube is subsequently expanded by the extruder with the mold halves pressing an opposite sides of the extruder head. As the mold halves close, they clamp about a portion of the tube, and the parison may be designed that they pinch the tube at or in the vicinity of opposite ends of the section which the mold. As the mold halves grip the tube, they pinch the tube, and seal the tube at opposite ends of the section which the mold. As the mold halves grip the tube, they pinch the tube, and seal the tube at opposite ends of the section which the mold. As the mold halves grip the tube, they pinch the tube, and seal the tube at opposite ends of the section which the mold.

[illegible] is illustrated in FIGURES 1 and 2, and generally indicated by the numeral 5. Since a complete description of the machine 5 is to be found in the above-mentioned Hendricks et al. patent, only those components of the machine 5 which are necessary for a complete understanding of the present invention will be described herein.

[illegible] A mold shell 6 which is suitably [illegible] is adapted for reciprocation [illegible] a suitable support 7 in operative association with the extruder 8 of the machine 5. A plurality of individual molds 9 are mounted in the mold assembly carried by the shell 6. Each mold 9 includes a mold half 12 which is [illegible] a mold assembly supported by the shell 6, and a mold half 14 which is [illegible] a mold assembly supported by the shell 6. A [illegible] mold half 12 is [illegible] with respect to the mold half 14 [illegible] the mold halves 12 and 14 [illegible] the mold halves 12 and 14 [illegible] the mold halves 12 and

6

threadably engaged in the extruder 15. The body 39 has a generally L-shaped passage therethrough which includes a horizontal leg 51 and a generally vertical leg 52. At the upper end of the vertical leg 52, the passage includes a counterbore 53.

As by extrusion die 42 is formed primarily of three parts. These three parts include a die shell 44, a mandrel 45 and a die core 46.

The mandrel 45 includes a support ring 47 which is seated in the vertical leg 52 of the passage through the body 39, and has the upper face thereof in engagement with a shoulder 48. The mandrel proper is connected to the support ring 47 by means of a suitable spider assembly 49 so that the mandrel 45 may be positioned with respect to the vertical leg 52. It is to be noted that the mandrel 45 is in the form of an elongated tubular member and extends from a point slightly above the lower end of the die shell 44 to the top of the body 39. The upper part of the body 39 is provided with a bore 50 which tightly receives the upper portion of the mandrel 45. The connection between the body 39 and the upper portion of the mandrel 45 is sealed by means of a gasket 51 which extends about the upper portion of the mandrel 45 and which is clamped against the body 39 by means of a nut 52 which is in the form of a gasket receiving nut and which is threadably engaged in an internally threaded bore 53 formed in the upper part of the body 39 concentric to the bore 50.

The die shell 44 has an intermediate outwardly directed projection 54. The projection 54 is larger than the vertical leg 52 of the passage through the body 39 and bears against the underside of the body 39. The die shell 44 is held in place by means of a clamp member 55 which is secured to the underside of the body 39 by bolts 56. The clamp member 55 has a socket 57 which receives the projection 54. It is to be noted that the socket 57 is larger than the projection 54 so that the die shell 44 may be shifted with respect to the clamp member 55 and the body 39 of the extrusion head 38. The lower surface of the socket 57 is defined by a shoulder 58 which engages the underside of the projection 54. At this time, it is pointed out that the upper end of the die shell 44 engages the underside of the support ring 47 so as to clamp the support ring 47 in place against the shoulder 48.

The clamp member 55 carries a plurality of tightener bolts 59 which are disposed on all sides of the clamp member 55 and which are preferably four in number. The set screws 59 engage the projection 54 so as to tighten the die shell 44.

The die core 46 includes an elongated shank 60 which is slidably received in the mandrel 45 for longitudinal sliding movement. The shank 60 projects from both ends of the mandrel 45 and terminates at its lower end in an enlarged end portion 61. The die core 46 is tapered intermediate the enlarged end portion 61 and the shank 60, as at 62.

The upper end of the shank 60 is externally threaded, as at 63. A nut member 64 is threadably engaged on the upper end of the shank 60. The die core 46 has a longitudinal air passage 65 extending therethrough. The air passage 65 includes an enlarged counterbore 66 which is adapted to receive the upper end of the shank 60. It is to be noted that the air passage 65 opens through the end of the die core 46. As is conventionally desired, pressurized air is adapted to be introduced into the air passage 65 and into the tube 17 so as to maintain the tube 17...

The upper part of the body 39 has secured thereto a pair of ears 66. The ears 66 support a pivot pin 67. A lever 68 is pivotally mounted on the pivot pin 67. One end of the lever 68 is threadably as at 69, with the threaded portion of the lever 68 receiving the upper part

7

end, downward movement of the die core 46 is limited to the position illustrated in FIGURE 4.

It is to be noted that the diameter of the die shell 44 and the diameter of the lower part of the mandrel 45 are each tapered to provide the desired thickness of tubing being extruded. The lower part of the mandrel 45 which is slightly above the extruder ring 3 serves to maintain the uniform dimension of the extrudate in the lower part of the die core 46 and by the lower portion of the die shell 44, the lower portion being provided with a cylindrical portion 71. As the plastic material passes through the die shell 44, the material frictionally engages the exterior surface of the die core 46 and urges the die core 46 to move in the direction of the air flow through the mandrel. Downward movement of the core 46 is limited by the engagement of the head 61 with the shoulder 62. Accordingly, the lower part of the shank 60 is normally spaced from the cylindrical portion 71 and the wall of the tube 17 extruded when the die core 46 is in this position is relatively thick. The internal diameter of the tube 17 is under constant circumferential tension of such magnitude, since the tube 17 must pass over the enlarged end portion 61 of the die core 46. Therefore, an increase in wall thickness results in an increase in external diameter of the tube 17.

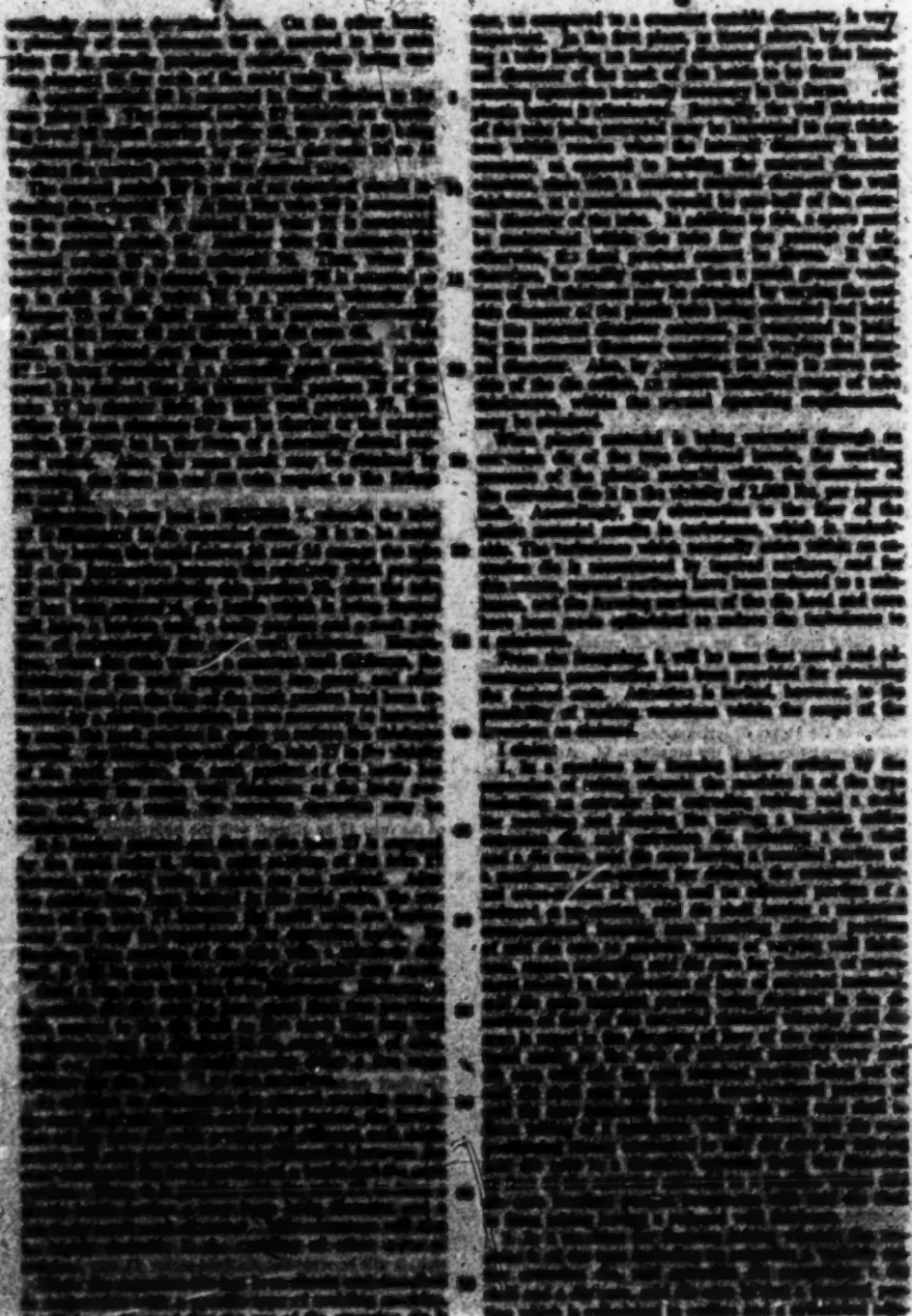
From the illustration of FIGURE 4, it will be readily apparent that should the die core 46 be moved upwardly so that the enlarged end portion 61 thereof be aligned with the cylindrical portion 71 of the die shell 44, as is shown in FIGURE 5, the effective cross-section of the orifice of the extrusion die 42 would be reduced with the result that the tube 17 would have a reduced wall thickness while [illegible] the same internal diameter. It will also be readily apparent that the change in wall thickness of the tube 17 may be brought about during an extrusion process without stopping the extrusion process. Further, it will be apparent that by pivoting the lever 68, the effect of the lever 68 on the combination air fitting and stop member 64 will be to increase or fill the die core 46 in the position illustrated in FIGURE 5. In view of this, the extrusion die 42 is of the variable orifice type, and the orifice may be varied during the extrusion process.

As pointed out above, and as is clearly illustrated in FIGURE 4, it is desired that the shell wall portion 27 of the tube 17 be aligned with the body portions 37 and 39 of the sections 35 and 36, respectively. In view of this, it is necessary that the orifice of the extrusion die 42 be adjusted in lateral relation to the tubulation of the mandrel 5. This is accomplished by means of a bolt 72 (two bolts of the adjustable type, all bolt shells being generally referred to by the numeral 72). The bolt shells 72 may be of any type, but preferably at least a pair of bolts as the plunger 73, for engaging the lower 69 to project the lower 69 about the pivot pin 67. The bolt means 72 is employed with respect to the extruder head 38 by means of a bracket 74.

Reference is now had to FIGURE 3, wherein the details of the control for the shell means 72 are illustrated. The bolt means 72 is in the form of an elongated member and threaded thereof to accommodate the action of an adjustable 75. The die tubes 72 is of conventional construction and includes a threaded member 76. The die tubes 72 includes an inner shell 77 for receiving the 75 and a guide of the [illegible] 78 and 79. As the lever 68 is pivoted in a clockwise direction about the pivot pin 67, it is necessary to [illegible] 75. A pair of [illegible] 80 and 81 are provided for the purpose of [illegible] 75 in the proper direction and [illegible] 82. From the bolt means 72 it is of the shuttle valve type. It will be seen that the bolt means 72 may be [illegible] to raise and lower the lever 68.

A cam plate 83 is normally secured on the shaft 8 of the [illegible] 8. The cam plate 8 normally rotates

[fol. 70]



[fol. 71]

flow over said terminal portion and have a constant internal diameter, said die shell having a minimum cross-section of forming area substantially equaling said terminal portion, said said adjacent portion of said die core to produce tubing of varying wall thickness, means mounting said die core for freedom of movement axially in the direction of flow of extruded material, said die core being urged out of said die shell solely by the flow of extruded material over said die core, means restoring movement of said die core out of said die shell to a position where said adjacent portion is aligned with said forming area and said terminal portion projects beyond said die core, and die core positioning means connected to said die core for returning said die core to a position where said terminal portion is aligned with said forming area to reduce the wall thickness of the tubing.

3. In a machine for forming hollow articles having areas of reduced cross-section by the expansion of tubing wherein the machine is of the turret type including a shaft, a plurality of molds mounted on said shaft for rotation about the axis of said shaft in a common plane, a fluid extruder for continuously extruding tubing with said molds sequentially receiving and removing portions of the tubing, a variable orifice extrusion die, said extruder die comprising a die shell and a die core, said die core having a terminal portion which is cylindrical in outline and a cylindrical adjacent portion of a reduced diameter, said die core being externally fixed intermediate said terminal portion and said adjacent portion whereby tubing being extruded will flow over said terminal portion and have a constant internal diameter, said die shell having a minimum cross-sectional forming area substantially equaling said terminal portion and said adjacent portion of said die core to produce tubing of varying wall thickness, said die core being urged out of said die shell by the flow of extruded material over said die core, means restoring movement of said die core out of said die shell to a position where said adjacent portion is aligned with said forming area and said terminal portion projects beyond said die core, die core positioning means connected to said die core for returning said die core to a position where said terminal portion is aligned with said forming area to reduce the wall thickness of the tubing and control means for the extension of said die core positioning means in response to the position of said shaft.

4. The device of claim 3 wherein said molds engage said tubing at points remote from said extrusion head and said tubing has a predetermined pattern conforming to the internal configuration of the molds and the spacing of the molds.

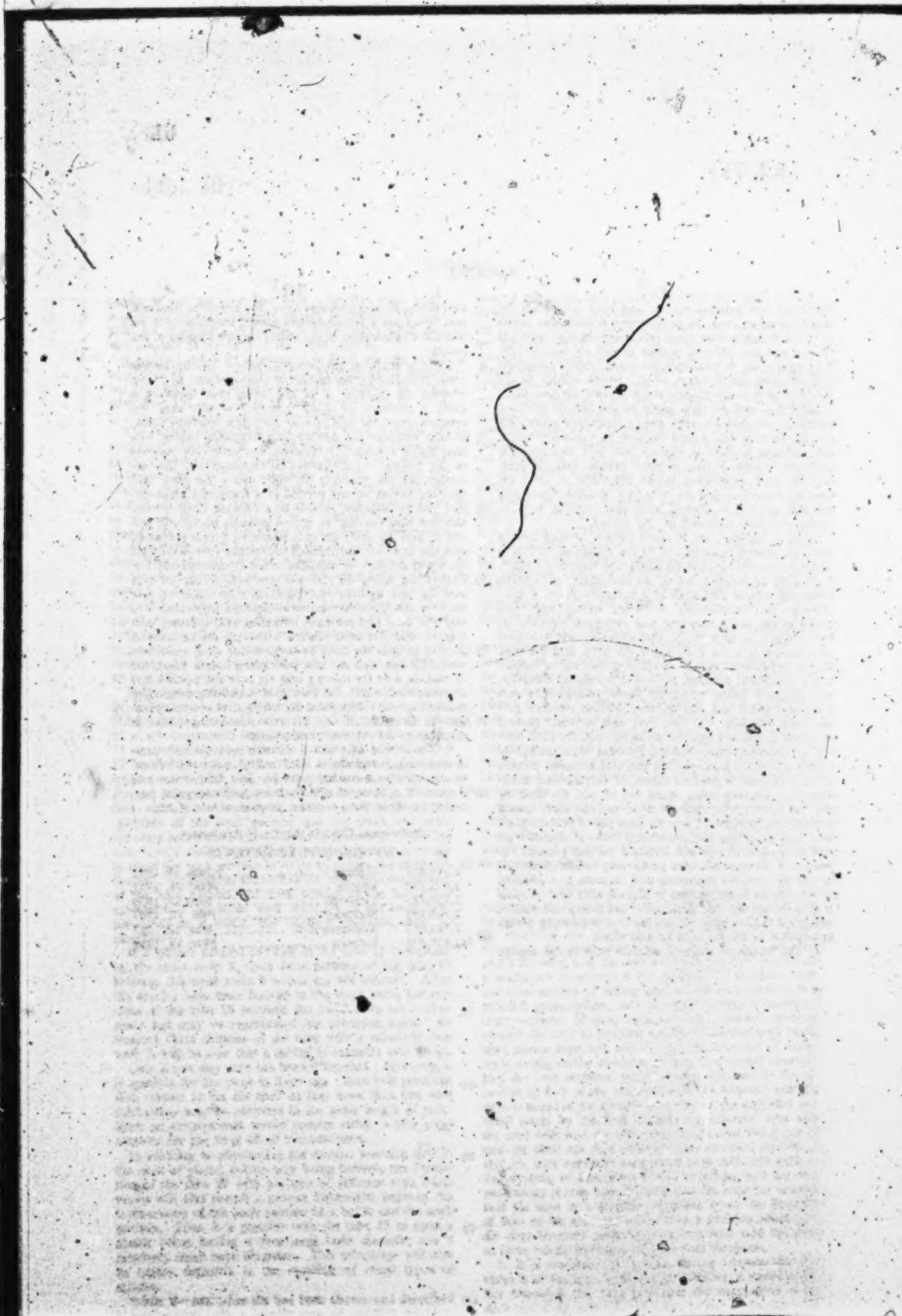
5. In a machine for forming hollow articles having areas of reduced cross-section by the expansion of tubing wherein the machine is of the turret type including a shaft, a plurality of molds mounted on said shaft for rotation about the axis of said shaft in a common plane, a fluid extruder for continuously extruding tubing with said molds sequentially receiving and removing portions of the tubing, a variable orifice extrusion die, said extruder die comprising a die shell and a die core, said die core having an end portion of a reduced cross-section, said die shell having an orifice defining portion at one end of said die shell, die core mounting means mounting said die core for longitudinal movement relative to said die shell, the flow of extruded material through said extruder die acting on said die core and portion to urge said die core through said die shell, stop means on said die core restricting movement of said die core relative to said die shell and normally retaining said adjacent portion of said die core aligned with said orifice defining portion of said die shell to form tubing of a maximum wall thickness, and die core positioning means connected to said die core for moving said die core and portion into alignment with said die shell orifice defining portion to reduce the wall thickness of the tubing, and control means for the extension of said die core positioning means in response to the rotation of said shaft.

6. The device of claim 5 wherein said die core positioning means includes a fluid motor, and said control means includes a control valve for said fluid motor and a plurality of cams on said shaft for positioning said control valve, there being one cam for each of said molds.

References Cited in the file of this patent:

UNITED STATES PATENTS

2,281,454	Hobson	June 30, 1942
2,432,302	Hobson	Dec. 24, 1947
2,720,675	Colombo	June 15, 1956
2,780,839	Sherman	Feb. 12, 1957
2,784,453	Rochberg et al.	Mar. 12, 1957
2,839,476	Lehman	Nov. 11, 1958



[fol. 73] Rejected Claims

1. In the formation of reduced diameter upper portion and enlarged bottom diameter containers by extruding a tubular parison and expanding the parison by internal air pressure within a mold comprising a pair of cavitated sections adapted to pinch together the walls of the parison along a bottom diameter in an axial plane of the formed container, the method that includes:

(1) extruding one extent of the parison having at opposite sides of said plane a relatively lesser wall thickness throughout a length of the parison which forms said reduced diameter portion of the container, and

(2) extruding another container bottom-forming extent of the parison of wall thicknesses at opposite sides of said plane which is greater than the first mentioned wall thickness and greater than the wall thickness of the last mentioned extent in said plane,

(3) internally blowing said bottom forming parison extent to conformance with the inside walls of said mold so as to cause the greater thickness of said parison wall at opposite sides of said plane to expand approaching the lesser thickness of said blown parison wall in said plane.

2. The method of claim 1, in which said greater wall thicknesses have essentially crescent-shaped increases at opposite sides of said plane.

3. The method of claim 1, in which said one extent of the parison is extruded at substantially uniform wall thickness.

5. The method of claim 1, in which said extents are extruded through an annular passage, and including the further step of blowing said extents by air flow through a passage surrounded by said annular passage.

6. The method of claim 1, in which said bottom-forming extent of the parison is extruded first, followed by extrusion of said one extent of the parison, and in which the total parison is blown to the mold configuration by [fol. 74] air introduced axially into the end of said one extent of the parison.

7. The method of claim 6, in which said greater wall thickness have essentially crescent-shaped increases at opposite sides of said plane.

8. Apparatus for forming hollow plastic containers by extruding and blow molding a tubular parison, comprising an outer tubular structure and a mandrel movable axially within and annularly spaced from the wall of said structure to form an annular extrusion passage, means for forcing plastic material through said passage to form a tubular parison, said structure including a die extent surrounding a portion of the mandrel and having at one relative axial mandrel position lesser annular spacing about and at opposite sides of an axial plane of the mandrel, and having in another relative axial mandrel position greater spacing about the mandrel which increases at opposite sides of said plan.., means for shifting the mandrel between said positions during extrusion of the parison to form the latter with different wall thicknesses corresponding to said spacings, and a pair of molding sections positioned to receive said parison upon extrusion, and means for blowing air to said parison for expanding same to conformance with the inside walls of said molding section.

9. Apparatus according to claim 8, in which said greater spacing about the mandrel has essentially crescent-shaped increases at opposite sides of said plane.

10. Apparatus according to claim 8, in which opposed extrusion surfaces of the mandrel and said die extent are essentially frustro-conical.

11. Apparatus according to claim 8, in which said die portion is recessed to form said greater spacing.

12. Apparatus according to claim 10, in which the frustro-conical surface of the die portion is recessed to form said greater spacing.

[fol. 75] 13. Apparatus according to claim 8, in which said means for blowing air comprises an axial through passage in said mandrel for the delivery of blowing air to the parison.

* * * *

[fol. 76]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

* * * * *

Present the Honorable Eugene Worley, Chief Judge, and the Honorables Giles S. Rich, I. Jack Martin, Arthur M. Smith and J. Lindsay Almond, Jr., Associate Judges.

The court was opened for business in due form.

Patent Appeal No. 7529

IN THE MATTER OF THE APPLICATION OF
JACK H. HOFSTETTER

MINUTE ENTRY OF ARGUMENT AND SUBMISSION—
Wednesday, December 8, 1965

Said appeal came on to be heard before the court and after hearing the arguments of counsel, the cause was taken under advisement by the court.

[fol. 77]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

October Term, 1965

Patent Appeal No. 7529

Serial No. 172,543

IN THE MATTER OF THE APPLICATION OF
JACK H. HOFSTETTER

OPINION—June 23, 1966

SMITH, Judge.

The issue presented is whether the subject matter of the appealed claims,[1] relating to a method and apparatus for producing blow molded plastic containers, is obvious within the meaning of 35 USC 103. The Board of Appeals affirmed the examiner's rejection based on the combined teachings of the prior art.

The subject matter sought to be patented involves the blow molding of plastic containers by initially forming a tubular expansible parison[2] which is then received within a multisection mold and expanded by internal air pressure to the mold configuration. The method and appartus claimed are particularly directed to making plastic containers having relatively wide variances between neck and bottom diameters, such as jugs or bottles in the half gallon to full gallon size range.

Appellant concedes that the appealed claims are directed to what he asserts to be an improvement over prior art methods and apparatus for blow molding such plastic con-

---

[1] Claims 1-3 and 5-13 inclusive of application Ser. No. 172,543, filed Feb. 12, 1962.

[2] The term "parison" derives from the glass bottle blowing art but is here used to signify the plastic softened charge which, like a parison of glass, is placed in the mold prior to blowing the bottle, but which unlike the parison of glass is extruded into the mold with wall portions of predetermined contours.

[fol. 78] tainers. According to appellant, the asserted improvement permits the blow molding of a plastic container using a minimum amount of plastic materials yet providing a *uniform* wall of the desired thickness throughout the container.

The problem faced by appellant and his proposed solution for it are best understood by referring to Figs. 1 and 2 of his patent application drawings.

FIG. 1.

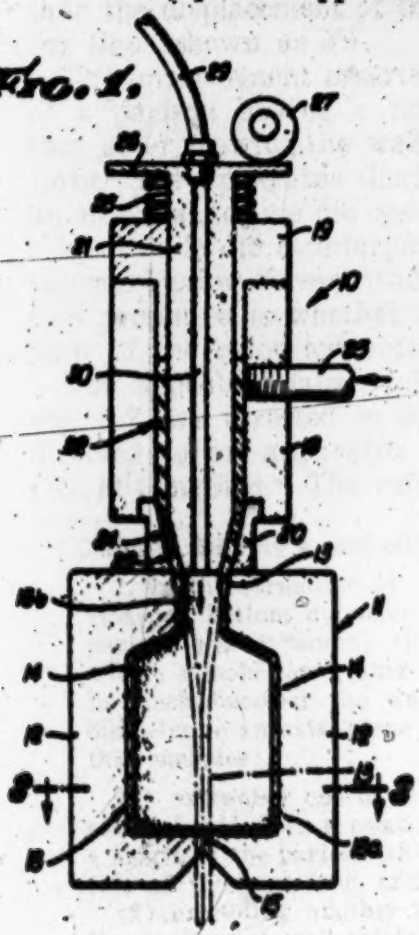
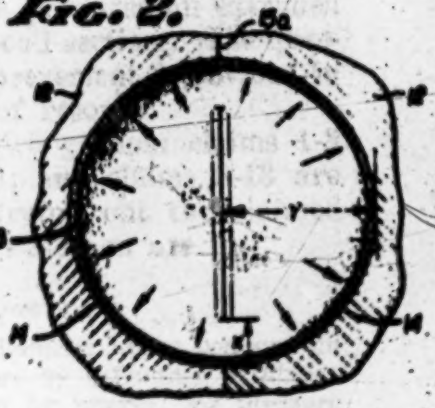
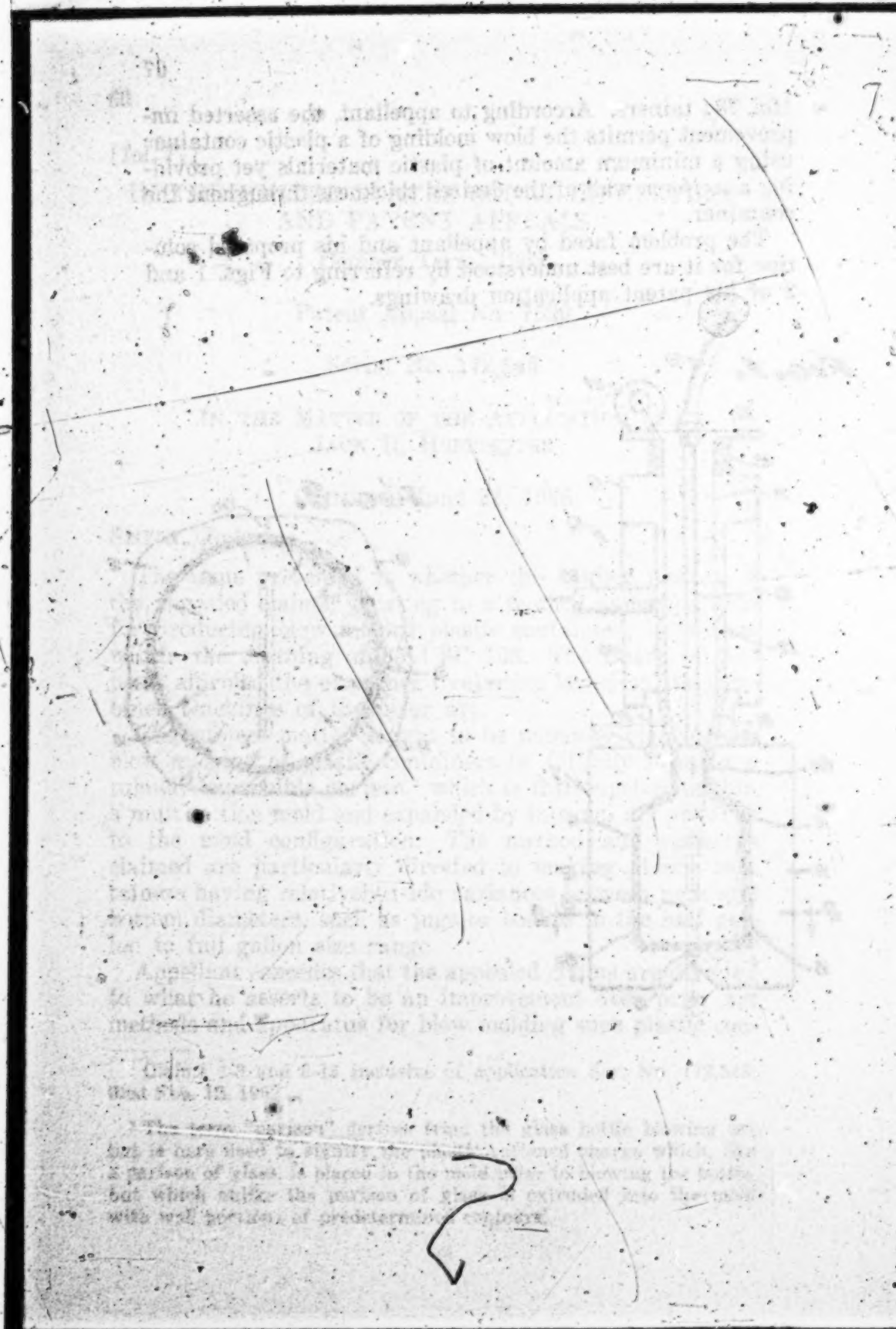


FIG. 2.





[fol. 79] In Fig. 1, the parison is shown at 13 and the container configuration desired is shown at 14. In Fig. 2, the parison is viewed from above the mold prior to blow molding with the container parting line shown at 15a. As appellant explains, the total displacement of the material near the parting line (shown as X) is much less than the displacement of the material normal to the parting line (shown as Y).

The improvement asserted by appellant is the extrusion of a parison having a nonuniform wall thickness such that after blowing, the wall thickness will *in fact* be uniform. The apparatus disclosed for this purpose includes an elliptical female die opening in cooperation with a cone shaped male die counterpart which produces an extruded parison having "crescent-shaped" wall sections. The question presented is whether this improvement is obvious in view of the prior art references of record.

The appealed claims fall into two groups: claims 1-3 and 5-7 are directed to a method; and claims 8-13 are directed to an apparatus for carrying out the claimed [fol. 80] method.[3] The references relied on are:

---

[3] Claim 1, defining a method, is as follows:

1. In the formation of reduced diameter upper portion and enlarged bottom diameter containers by extruding a tubular parison and expanding the parison by internal air pressure within a mold comprising a pair of cavitated sections adapted to pinch together the walls of the parison along a bottom diameter in an axial plane of the formed container, the method that includes:

(1) extruding one extent of the parison having at opposite sides of said plane a relatively lesser wall thickness throughout a length of the parison which forms said reduced diameter portion of the container, and

(2) extruding another container bottom-forming extent of the parison of wall thickness at opposite sides of said plane which is greater than the first mentioned wall thickness and greater than the wall thickness of the last mentioned extent in said plane,

(3) internally blowing said bottom forming parison extent to conformance with the inside walls of said mold so as to cause the greater thickness of said parison wall at opposite sides of said plane to expand approaching the lesser thickness of said blown parison wall in said plane.

[Footnote Continued on page 67]

Negoro	3,019,481	Feb. 6, 1962
Sherman	2,780,835	Feb. 12, 1957
Haines	2,632,202	Mar. 24, 1953

The board preferred to affirm the rejection of claims 1-3, and 5-7 as being unpatentable over either Haines or Ne- [fol. 81] goro in view of Sherman.[4] The board's statement of this rejection was as follows:

> * * * Both Haines and Negoro clearly teach forming a tube of nonuniform wall thickness and placing this tube in a mold where it is blown into a container of uniform wall thickness. This is the concept that appellant is claiming and it is taught by Haines and Negoro. Sherman teaches extruding a tube of crescent-shaped thickened portions thereon and to modify the tubes of either Haines or Negoro to include this teaching of Sherman would be a mere matter of choice and design. * * *

As to apparatus claims 8-13, the board stated as follows:

---

[3] [Continued]

Claim 8, defining an apparatus, is as follows:

> 8. Apparatus for forming hollow plastic containers by extruding and blow molding a tubular parison, comprising an outer tubular structure and a mandrel movable axially within and annularly spaced from the wall of said structure to form an annular extrusion passage, means for forcing plastic material through said passage to form a tubular parison, said structure including a die extent surrounding a portion of the mandrel and having at one relative axial mandrel position lesser annular spacing about and at opposite sides of an axial plane of the mandrel, and having in another relative axial mandrel position greater spacing about the mandrel which increases at opposite sides of said plane, means for shifting the mandrel between said positions during extrusion of the parison to form the latter with different wall thicknesses corresponding to said spacings, and a pair of molding sections positioned to receive said parison upon extrusion, and means for blowing air to said parison for expanding same to conformance with the inside walls of said molding section.

[4] The board also affirmed the rejection of these claims as unpatentable over Sherman in view of Haines or Negoro.

Claims 8 through 13 stand rejected as unpatentable over Sherman in view of either Haines or Negoro or as unpatentable over either Haines or Negoro in view of Sherman. The Examiner takes the position the claims are readable on the apparatus of Sherman when combined with the container molding halves and means for blowing air into the extruded tube taught by either Haines or Negoro. Further, as with the method claims above, the Examiner holds the references may be reversed and if this is done, it would be obvious to use the dual crescent-shaped orifice of Sherman in the apparatus disclosed by Haines or Negoro.

The subject matter is so claimed in the appealed claims that the references need not be discussed in detail. Both Negoro and Haines are concerned with blow molding of plastic articles. Appellant argues that while both refer to an article having uniform wall thickness, neither reference teaches a method or apparatus wherein this goal is achieved. Rather, the references disclose a finished article having substantially uniform wall thickness. The Negoro reference in pertinent part states:

[fol. 82] It is therefore another object of the invention to provide a novel extruder for a machine which forms hollow articles by expanding a tube within a mold, the extruder having a variable orifice die which is of such a construction that the thickness of the tubing may be varied during the extrusion process so that portions of the tubing which are to be expanded the least will have a lesser wall thickness, with the result that the finished article will have a *substantially uniform wall thickness.* [Emphasis added.]

The Haines reference states:

• • • I propose to extrude tubes into appropriate position relative to open molds and then to close the molds over these tubes and blow the tubes into the shape of hollow containers in said molds in regular sequence. I propose that the tubes shall be formed as extruded so that approximately exactly the neces-

sary material is supplied at each region at which greater or less materials are required so that the final plastic container shall have a *substantially uniform wall thickness throughout* without stress and strain and without weaknesses or waste of material which might otherwise be occasioned. [Emphasis added.]

Negoro, Haines and applicant disclose apparatus wherein, as relevant here, the space between the female portion of the extrusion die and the male portion thereof may be varied during extrusion of the parison to vary the wall thickness of the parison along its *length*. Neither Negoro or Haines, however, discloses appellant's means for *simultaneously* controlling the wall thickness of the parison across its *width*. Appellant's arguments are therefore well taken. Furthermore, it appears inconsistent to maintain that Negoro and Haines teach uniform wall thickness and also find it necessary to add the teachings of Sherman. [fol. 83] Sherman relates to forming plastic tubing and discloses an apparatus for extruding plastic tubes in which the wall thickness is controlled. Figs. 4 and 5 of Sherman's drawing show a cross sectional view of the male and female die portions of his proposed apparatus and are here reproduced.

Fig. 4.

Fig. 5.

Referring to the above figures, it is seen that Sherman discloses a female die portion consisting of four parts (designated as 13 through 16 in the above figures). The Sherman specification states:

> * * * The outside dimensions of the tubing are determined by the sections of the body as is the outside shape and thickness of the tubing. * * * Movement of the movable sections *15, 16* toward and away from the outer mandrel will change the outside dimensions, shape and thickness of the tubing. * * *
>
> It may thus be seen that the apparatus provides for the change of the inner dimensions and shape, outer dimensions and shape, and thickness of the tubing during extrusion, without any interruption of the extrusion.

Thus, it appears that Sherman discloses an apparatus for varying the wall thickness of a tube extrusion uni- [fol. 84] formly along its length which also provides that the cross sectional shape of the tube may be changed without interruption of the extrusion through the cooperation of two stationary and two movable female die portions.

Appellant's argument relative to Sherman is:

> * * * In brief, Sherman is totally unrelated to any method or apparatus for forming and blowing a container to uniform wall thickness.

Sherman is admittedly concerned with extruding tubes and the structure shown by Sherman is dissimilar to that shown by appellant. Sherman does disclose the concept of changing the cross sectional shape of the extruded tube and varying the wall thicknesses. Also, the various portions of the die may be set in such a manner as to extrude a tube having varying wall thickness around the perimeter of a cross sectional view of the extruded tube.

It is apparent from the record that appellant has eliminated waste material in the operation of blow molding containers, particularly containers having relatively wide variances between the neck and bottom diameters, e.g., "in the half-gallon to full gallon size range." Appellant achieves this by simultaneously varying the wall thickness of the parison radially as well as longitudinally according to the final configuration desired in the blow molded article. Neither Haines or Negoro, concerned with the same problem as appellant in the blow molding of containers, discloses such a method or apparatus. Sherman,

[fol. 85] for different purposes, teaches the extrusion of tubes having varying radial thickness measured on a cross section.

It seems that the relevancy of Sherman to the blow molding art, viewed in combination with Haines or Negoro is not appreciated until appellant's invention is examined. Thus, appellant's invention is realized only through hindsight. This we may not do.

We agree with the solicitor's argument that:

> * * * It is well settled that, as stated in *In re Krogman*, 42 CCPA 1037, 223 F. 2d 497;
>
> > Whether a reference is pertinent, or a combination of references is proper, depends solely upon what is reasonably and realistically taught thereby in relation to that which is claimed.

However, we are doubtful that appellant's invention would have been obvious to one of ordinary skill in the art from the teachings of record other than by employing hindsight reasoning.

We are aware that the Court of Appeals, District of Columbia, in its per curiam opinion in *Reynolds* v. *Aghnides*, —— F. 2d ——, 148 USPQ 245 (1966), stated the difference in the law applied in that court as contrasted with this court in determining patentability when the existence of any prerequisite thereto is in doubt. The court, consisting of Bazelon, Chief Judge, and Wright and Tamm, Circuit Judges, said:

> Appellee alleging unlawful denial of his patent application by the Patent Office, petitioned the District Court, under 35 U.S.C. § 145, to authorize issuance of the patent by the Commissioner. Although finding that "some doubt exists as to the utility" of [fol. 86] appellee's claimed invention, the trial court, citing Application of Nurkiewicz, 52 CCPA 848, ——, 338 F. 2d 1020, 1022, 143 USPQ 421, 422 (1964), as its authority, resolved the doubt in favor of the applicant and ordered [5] the Commissioner to grant

[5] The District Court cannot "*order*"—it "authorizes." 35 USC 145.

the patent. Aghnides v. Reynolds, D.D.C., 241 F. Supp. 280, 145 USPQ 411 (1965). In so doing the trial court erred. Whatever may be the rule in patent review proceedings before the United States Court of Customs and Patent Appeals, in trials de novo under 35 U.S.C. § 145 in the District Court "doubt [as to patentability] is to be resolved," not in favor of the applicant, but "in favor of the correctness of administrative * * * action."* General Motors Corporation v. Coe, 74 App. D.C. 189, 190, 120 F. 2d 736, 737, 50 USPQ 10, 11, cert. denied, 314 U.S. 688, 51 USPQ 546 (1941). [Other cases cited.]

There are very sound policy reasons underlying the rule applied in this court, and supposedly in the Patent Office, that doubts are to be resolved in favor of applicants. Several of the factors properly taken into account in determining patentability, especially unobviousness and utility, are often not known at the time when the application is being prosecuted in the Patent Office but are developed later, perhaps even after the patent is issued. It therefore is proper that doubt should be resolved in favor of applicants so that they shall not be denied patents which later events may show them entitled to. Among such events, [fol. 87] which may even have to await patenting, are commercial success, unexpected utility, displacement of competing devices, etc.

The so-called "rule of doubt" is an ancient one, its common-sense basis having been recognized as early as 1827. It was applied by the Court of Appeals of the District of Columbia long before this court came into existence. See McCrady, Patent Office Practice § 118 (4th ed. 1959) and cases there cited. That court continued to apply the rule thereafter. See *Battery Patents Corp.* v. *Coe*, 68 App. D.C. 61, 35 USPQ 47 (1937). A dissent by Judge Edgerton may have started a trend by the Court of Appeals, D.C., in the direction of its present view. See *Carbide &*

---

*The full quotation is as follows:

* * * doubt is to be resolved, in suits to obtain a patent as in suits of other sorts, in favor of the correctness of administrative and judicial action.

Carbon Chemicals Corp. v. *Coe*, 69 App. D.C. 372, 40 USPQ 141 (1938). In *Magnaflux Corp.* v. *Coe*, 139 F. 2d 531, 60 USPQ 3 (1943), Judge Edgerton in writing the opinion for the court gave effect to the presumption of administrative correctness. In *National Lead Co.* v. *Kingsland*, 74 F. Supp. 985, 76 USPQ 174 (D.D.C. 1948), Judge Holtzoff concluded that in the District of Columbia the rule of doubt was dead. These cases show that the court was trying, in that period, to follow the lead of the Supreme Court in "raising the standard of invention." This occurred prior to the 1952 Patent Act.

We continued to believe that the "rule of doubt" is a sound rule making for a better and fairer operation of the patent system and that the reasons for its abandonment in the District of Columbia courts are not persuasive. In the present case we apply it for the same valid reasons stated at its inception:

> [fol. 88] In every case of doubt, however, it would seem to be more congenial with the policy of the law to afford the citizen an opportunity of trying the validity of his right by issuing a patent. [2 Op. Atty. Gen. 52, 4 June 1827.]

We are, therefore, resolving our dobuts on this issue in favor of appellant and solely on this basis reverse the rejection of these claims.

In view of the foregoing, the decision of the board is *reversed*.

REVERSED

WORLEY, C. J., concurs in the result.

[fol. 89]

June 23, 1966

MARTIN, Judge, dissenting.

Although I agree with the majority opinion that the rule of law in this court is one of resolving doubt in favor of the applicant, I do not find appellant's case so strong here as to call that rule into play. For the reasons given by the examiner and the board, it is my view that the claimed method and apparatus for simultaneously controlling the parison wall thickness along its length and in its cross section are obvious in view of the references of record. I would affirm.

[fol. 90]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Present the Honorable Eugene Worley, Chief Judge, the Honorables Giles S. Rich, I. Jack Martin, Arthur M. Smith and J. Lindsay Almond, Jr., Associate Judges, and the Honorable William J. Kirkpatrick*, United States Senior Judge for the Eastern District of Pennsylvania.

The court was opened for business in due form.

Patent Appeal No. 7529

IN THE MATTER OF THE APPLICATION OF JACK H. HOFSTETTER

JUDGMENT—June 23, 1966

Said appeal having heretofore been brought on to be heard before the court and due consideration thereon having been had, it is—

---

* Kirkpatrick, J., participated in place of Worley, C. J., in Patent Appeal Nos. 7612, 7559 and 7647, but took no part in the consideration of or decision on the other cases which opinions or other orders have been filed.

ORDERED that the decision of the Board of Patent Appeals be, and the same is hereby, reversed. Opinion by Smith, Associate Judge. Chief Judge Worley concurs in result. Dissenting opinion by Martin, Judge.

[fol. 91]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

* * * * *

Present the Honorable Eugene Worley, Chief Judge, the Honorables Giles S. Rich, I. Jack Martin, Arthur M. Smith and J. Lindsay Almond, Jr., Associate Judges, and the Honorable William J. Kirkpatrick*, United States Senior Judge for the Eastern District of Pennsylvania.

The court was opened for business in due from.

Patent Appeal No. 7529

IN THE MATTER OF THE APPLICATION OF JACK H. HOFSTETTER

ORDER DENYING PETITION FOR REHEARING—October 6, 1966

Petition for rehearing having been filed on behalf of the Commissioner of Patents and due consideration thereon having been had, it is—

ORDERED that said petition be, and the same is hereby, denied.

---

* Kirkpatrick, J., participated in place of Worley, C. J., in Patent Appeal No. 7590 and in petitions for rehearing in Patent Appeal Nos. 7562, 7589, 7613, 7862 and 7609, but took no part in the consideration of or decision on the other cases in which opinions or other orders have been filed.

[fol. 92]

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal No. 7529

IN THE MATTER OF THE APPLICATION OF JACK H. HOFSTETTER

CERTIFICATE RE MANDATE OF COURT OF CUSTOMS AND PATENT APPEALS

The final mandate in the above-entitled appeal, consisting of a certified copy of the order of the court of the 23rd day of June, 1966, was issued to the Commissioner of Patents on the 14th day of October, 1966.

/s/ George E. Hutchinson
Clerk

[fol. 93]

[Clerk's Certificate to foregoing transcript omitted in printing]

[fol. 94]

SUPREME COURT OF THE UNITED STATES

No. ——, October Term, 1966

EDWARD J. BRENNER, Commissioner of Patents,
PETITIONER

vs.

JACK H. HOFSTETTER

ORDER EXTENDING TIME TO FILE PETITION FOR WRIT OF CERTIORARI—January 4, 1967

UPON CONSIDERATION of the application of counsel for petitioner(s),

IT IS ORDERED that the time for filing a petition for writ of certiorari in the above-entitled cause be, and the same is hereby, extended to and including February 3, 1967.

/s/ Earl Warren
Chief Justice
of the United States.

Dated this 4th
day of January, 1967

[fol. 95]

SUPREME COURT OF THE UNITED STATES

No. 1002, October Term, 1966

EDWARD J. BRENNER, Commissioner of Patents,
PETITIONER

v.

JACK H. HOFSTETTER

ORDER ALLOWING CERTIORARI—April 10, 1967

The petition herein for a writ of certiorari to the United States Court of Custom and Patent Appeals is granted, and the case is placed on the summary calendar.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

☆ U. S. GOVERNMENT PRINTING OFFICE, 1967 261862 842